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Macworld

**SPECIAL
REPORT**

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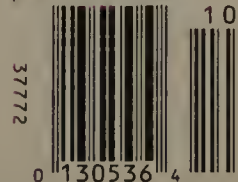
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**Motorola's
CHRP Screamer,
page 84**

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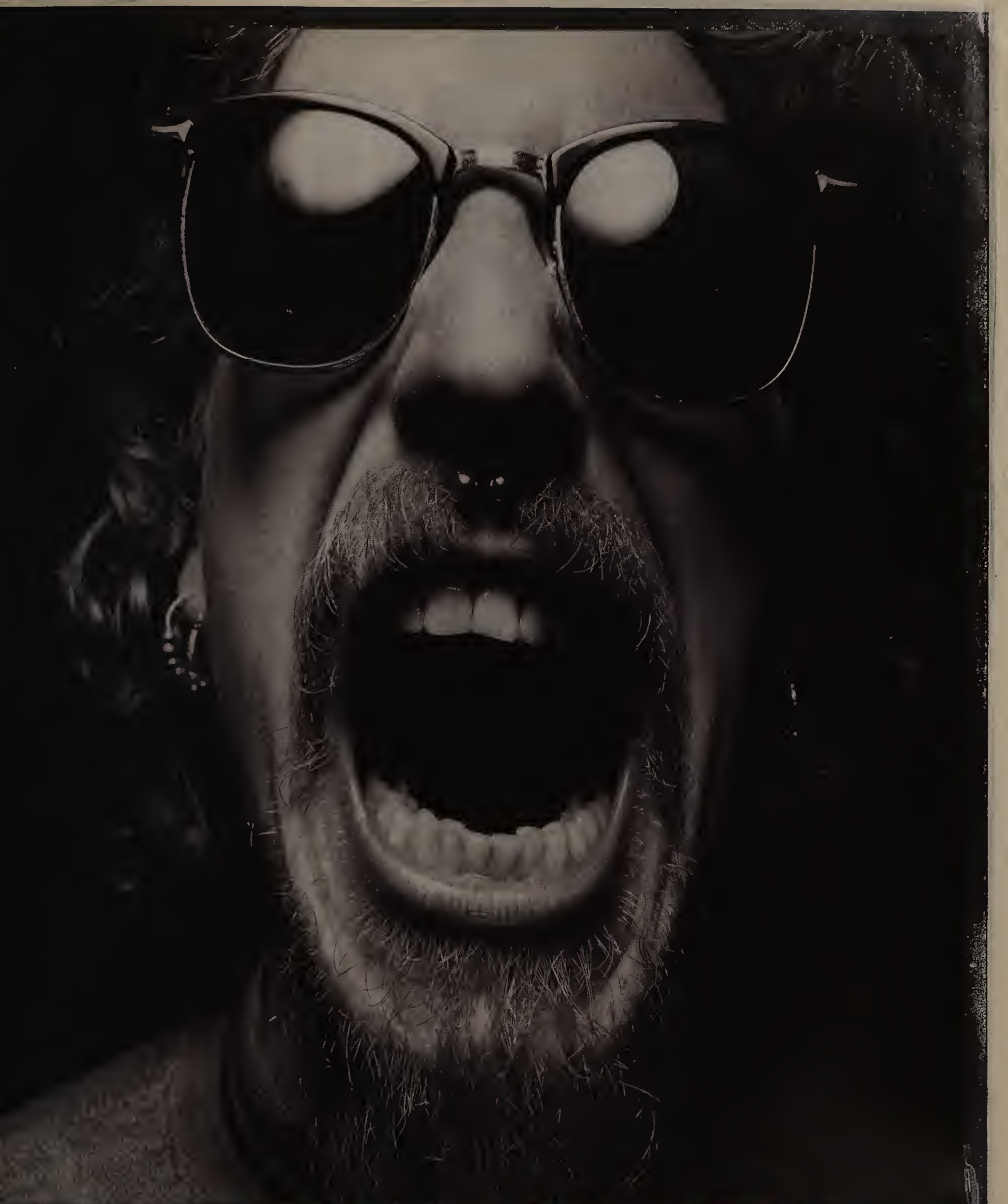
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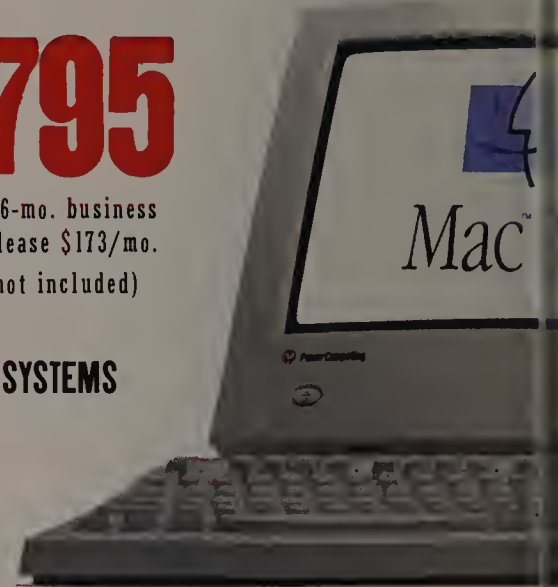
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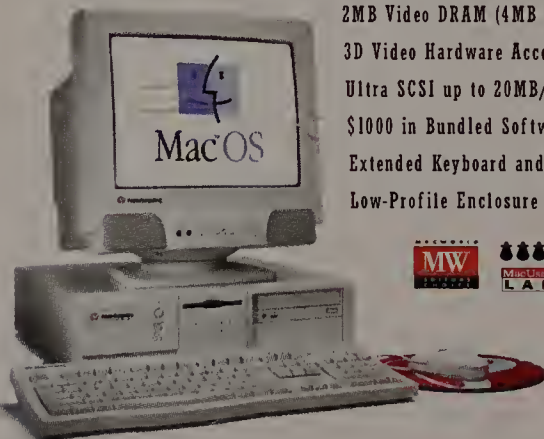
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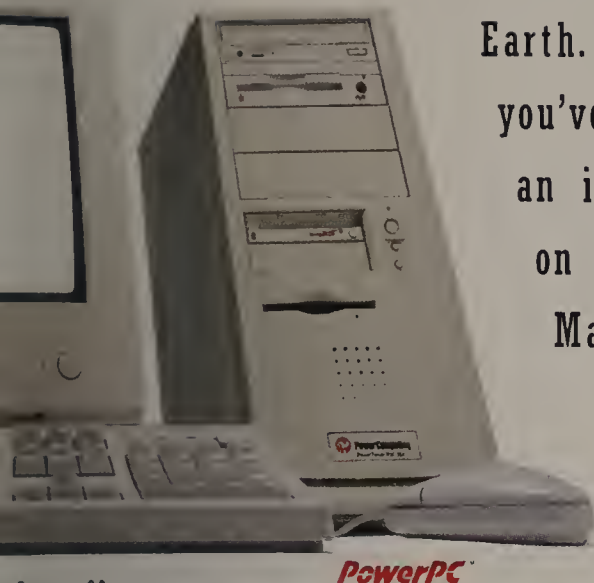


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Umax rolls out the industry's first system with in-line cache, the home-office SuperMac C600x, page 46.



Commotion video-painting software helps the Mac play a bigger role in film production, page 28.

Need a second printer? The Alps Masterpiece MD-2300 produces photographic-quality output for under \$1000, page 52.

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Recent events at Apple leave little doubt as to who's in control.

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Sneak Peek

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Claris adds tool bars and Web links to an otherwise modest upgrade.

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The competition was fierce, but *Macworld's* editors managed to pick the hottest new products introduced at Macworld Expo in Boston.

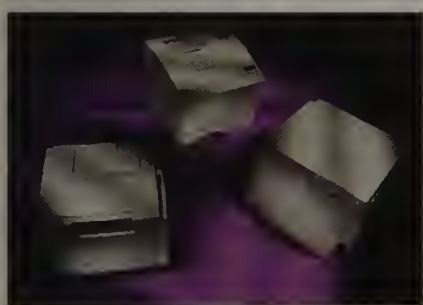




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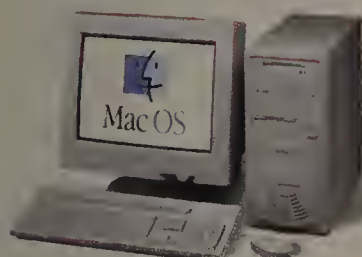
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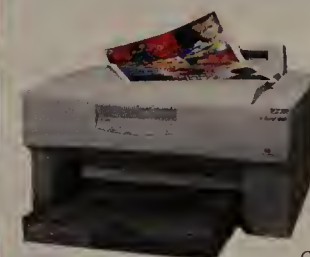
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How to Improve Your OCR Accuracy and

Caere Corporation (NASDAQ: CAER) recently announced an upgrade that makes the OmniPage Pro optical character recognition (OCR) major software resellers for an estimated street price of only \$129. This upgrade is an inexpensive way for scanner users to step up to fully-featured OCR product (including those bundled with flatbed and edge feed products) can upgrade to the full version of OmniPage Pro at a \$

OmniPage Pro has a separate upgrade package available through Computer City, Egghead, and Best Buy. Since the vast majority of Caere OCR, most scanner users are eligible to upgrade at this group.

The large number of scanner manufacturers that bundle Caere OCR Microtek, Canon, Plustek, Unix, Nikon, Agfa, Logitech, Relsys are eligible for the upgrade.

The upgrade program includes OmniPage Pro 6.0 (Windows 3.1 and 7.0 (Windows 95), which offer all the capabilities of the bundled features for extended functionality. Most notable among them are higher resolution and preprocessing of scanned images, verifiers for the Page technology for the retention of the original page formatting, as well as OCR training and deferred processing capabilities.

The Changing OCR Market: In the not so distant past, OCR required hardware and OCR software that was often difficult to use and provided. These issues were frustrating and limited the use of OCR to high volume vertical markets. The use of desktop OCR was limited to the

"Today, several trends are contributing to the widespread use of OCR by users faced," said Chad Kinzelberg, Caere's vice president of market. OCR users faced," said Chad Kinzelberg, Caere's vice president of market. OCR users faced," said Chad Kinzelberg, Caere's vice president of market.

Analysts following the OCR market agree that OCR use is on the rise. Industry trends promoting its mainstream adoption:

Higher Customer Awareness: An increased number of computer users are realizing the time and money saving benefits it provides.

Higher Scanner Penetration: Scanners prices have dropped drastically. Many flatbed grayscale scanners available for under \$500. Also, attractive, new scanner form factors (such as the small-footprint sheet-fed scanners) and multifunction devices have entered the market.

Increased OCR Accuracy: OCR developers have developed high accuracy OCR technology for increased output. The greatest improvement has been made on degraded and hard to read documents.

Improve Your OCR and Save Big \$\$\$

Higher Scanner Penetration:

Scanners prices have dropped drastically in the last few years with many flatbed grayscale scanners available for under \$500. Also, attractive, new scanner form factors (such as the small-footprint sheet-fed scanners) and multifunction devices have entered the market.



Low cost scanners entering the market have helped push OCR use to a new level.

Increased OCR Accuracy:

OCR developers have developed high accuracy OCR technology for increased output. The greatest improvement has been made on degraded and hard to read documents.

Pricing and Availability

OmniPage Pro 7.0 (Windows and Mac) and WordScan Plus 4.0 (Windows) upgrade packages are immediately available at major resellers for an estimated street price of \$129.

The Company:

Caere Corporation, with U.S. headquarters in Los Gatos, Calif. and European headquarters, Caere GmbH, in Munich Germany, is a leader in OCR technology and desktop document management products. Caere has recently expanded its product line of OCR

OmniPage Pro gives you almost twice the OCR accuracy with the same ease-of-use as OmniPage Limited Edition.

OmniPage Pro keeps text in its original format and layout, including graphics.

OmniPage Pro even outputs to HTML.

continued on next page

OmniPage Limited Edition

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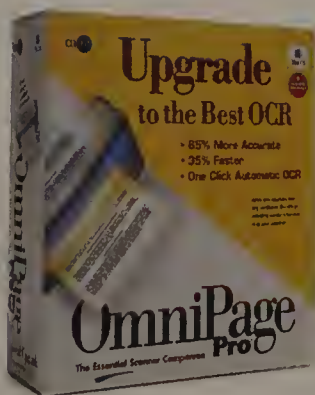
Sure, the OmniPage Limited Edition OCR that came with your scanner is good. In fact, that's why scanner makers like HP, Microtek and Agfa chose it above all others.

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OmniPage Pro employs a new, more powerful OCR engine to recognize poor copies and degraded faxes. It integrates seamlessly with your favorite applica-

tions like Microsoft Word, WriteNow and more. It even guides you through the OCR process using its AutoOCR Toolbar. All with the simple push of a button.

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Key Feature Comparison	OmniPage Pro	OmniPage Limited Edition
Caere's fastest and most accurate OCR engine	✓	
AutoOCR Toolbar™ for easy, one-button OCR processing	✓	
OCR Wizard to guide you through the process	✓	
Integrates with most image editors like Photoshop	✓	
OCR from within your favorite applications	✓	✓
Retains original layout	✓	

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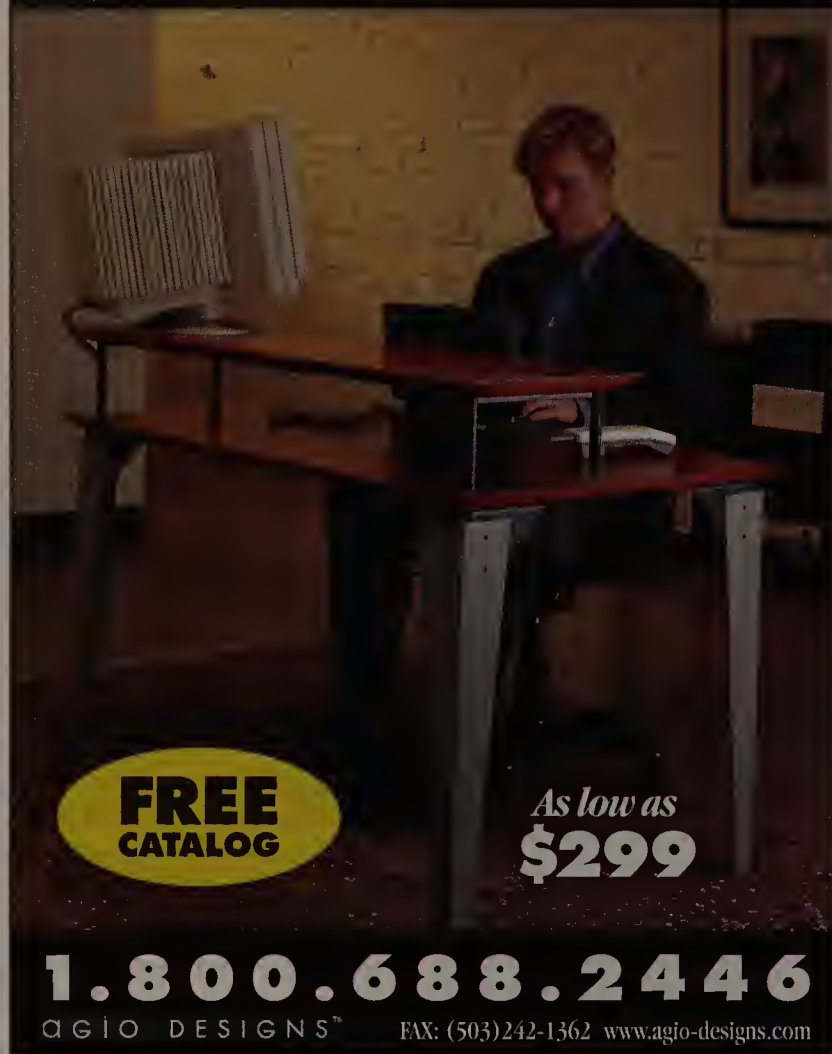
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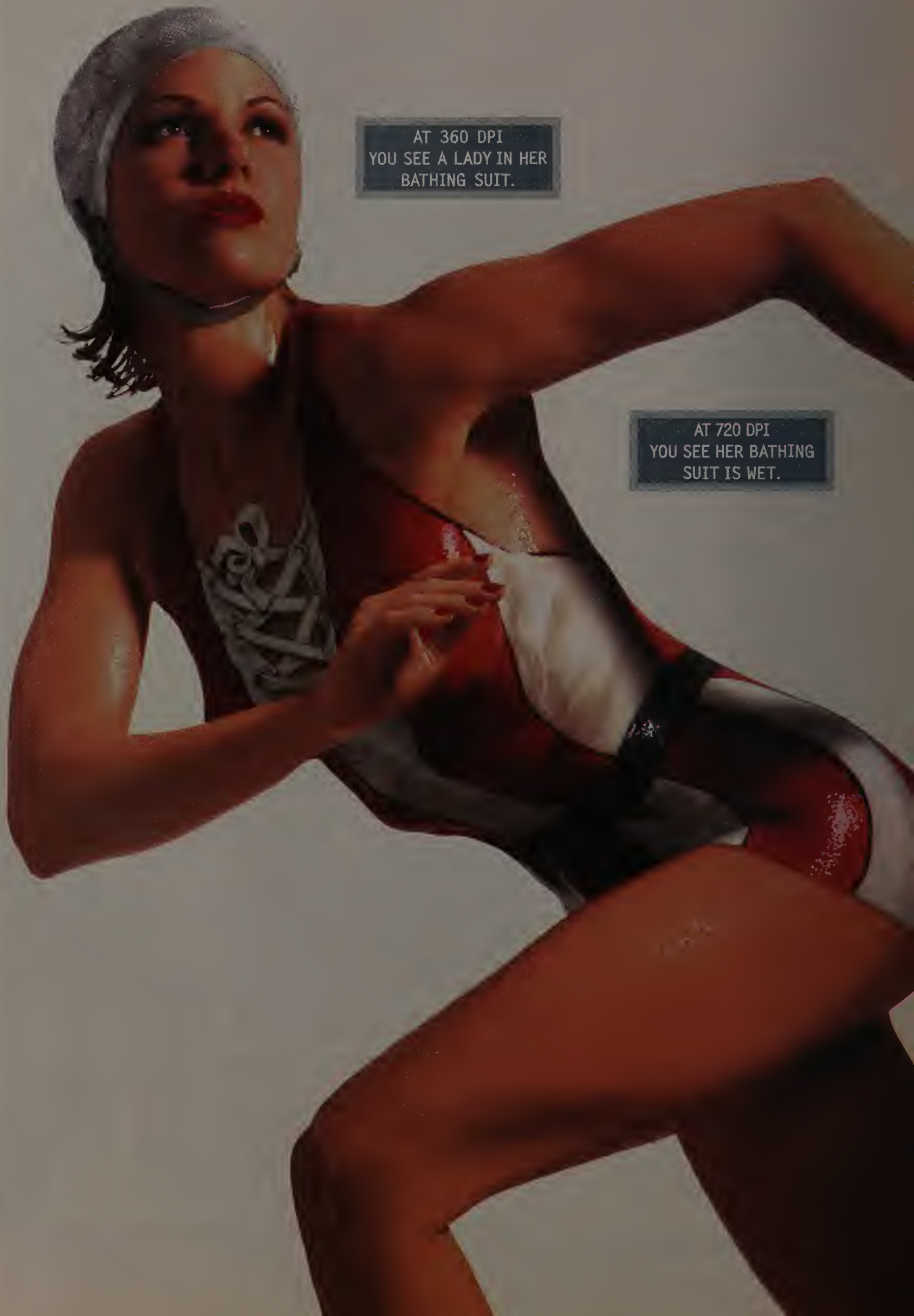


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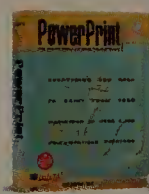
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Letters

Nuts about Newton

AFTER READING THE REVIEW OF Apple's MessagePad 2000, I had to wonder if *Macworld* was nuts (*Reviews*, July 1997).

It's fairly plain to any regular user of the MP 2000 that the review—although factually accurate—misconstrues the market and functionality the device was designed to address. This is a serious computer designed to meet the needs of doctors, lawyers, researchers, engineers, multimedia producers, and similar mobile professionals.

You criticize the size of the MP 2000, failing to notice that it fits perfectly in a doctor's lab coat or a Day-Timer-style case. In your criticism of the new Inter-Connect port, you miss its versatility and performance, which open the door to audio input/output, for example.

Most questionable, however, is the price comparison of the MP 2000 to a Pentium notebook. Show me the color 8MB/700MB Pentium notebook that goes for days between charges, rests unobtrusively in the palm of my hand, recognizes my handwriting, powers on instantly, is optimized for truly mobile communications, and sells for \$1099, and I'll reconsider this nutty review.

TODD WILSON
Somerville, Massachusetts

People love their Newtons. It's been a long time since we've seen such positive remarks about an Apple product. Your letter made me want to rush out and buy a Newton. Of course, \$1100 isn't pocket change, as our reviewer, Cameron Crotty, pointed out. Crotty also adds, "No computer can do what the Newton MessagePad 2000 does—it exists in a class by itself. But while that has a nice ring to it, just remember that it's an awfully expensive class. I really



liked the MessagePad 2000, I just couldn't imagine paying nearly \$1100 for it."—Ed.

Control Strip under Control

I ALSO WONDERED WHERE THE Control Strip was, and why I didn't have it since I updated from System 7.5.3 to 7.5.5 (*Letters*, July 1997). You can't custom install something that isn't included on the master system software CD-ROM. I asked around a lot and finally got the answer.

The Control Strip control panel came bundled only on certain Power Macintosh and Performa series computers. However, you can install the Control Strip software by installing Apple's Display Software (version 2.0.2). This can be downloaded from Apple's software library, swupdates.info.apple.com; click on Macintosh, then on Display-Peripheral.

CARL A. SWEDBERG
Issaquah, Washington

Comparing Apples and Oranges?

YOUR COMPARISON OF THE TOP-OF-the-line Macs and PCs is infuriating ("The Mac Wins the Race," July 1997). It's not that I like PCs—I don't—but I feel the article needlessly gave up some points for the Macs by stressing that the Macs are more expensive.

You should instead focus on value, showing that while the Macs reviewed are more expensive, Macs get more performance per dollar. Or you should have tested less expensive versions of the PowerCenter Pros to show that they still whip the PCs' butts. Saying that Macs are faster is great, but the message is greatly diminished when you leave ammunition on the table for the other side to use. I can already hear my Windows-using colleagues saying, "Yeah, but like he said, Macs are still more expensive." A little more careful selection and there wouldn't have been any "but" for PC users to throw at Mac owners.

TAI MORRIS
Austin, Texas

AT THE END OF YOUR STORY YOU stated that the Mac and clones are still more expensive, and there are two things I have to say about this.

First, in the June 1997 issue of *PC World*, Apple rates among the top three computer manufacturers in product reliability. That must be worth a penny or two.

Second, have you ever tried to set up a Windows 95 printer, scanner, or anything else that's not standard on the computer? Setting up a Windows machine just takes time, even for experienced users. If time is money, the cost difference between Macs and Windows

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LETTERS

CORRECTIONS

- *The ForeFront Group's Web address is www.ffg.com (Quick Tips, July 1997).*
- *Tasa Graphic Arts' Web address is www.swcp.com/~tasa/ ("Back-to-School Guide," August 1997).*
- *The trackball on Kensington Micro-ware's Orbit Trackball can be removed for cleaning or replacement (Reviews, August 1997).*
- *Although the price of Insider Software's Font Box 2.1 hasn't changed (the Standard Edition is \$79.95), a Personal Edition, which analyzes only 250 fonts, is now available for \$29.95 (Reviews, August 1997).*

machines becomes enormous, with the Mac winning hands down.

I am not knocking PCs, because both platforms offer advantages. The Mac is simply a superior machine, especially in the plug-and-play and ease-of-use arenas. We want a platform that is easy to use, is easy to train on, and doesn't need a lot of tweaking to operate properly.

Keep up the good work. Don't be afraid to compare more Windows products with Mac products. It helps me do my job better and be more informed.

JERRY AXTELL
Macon, Georgia

I AM NOT SOME RADICAL WINTEL USER. I currently use a Power Macintosh 9500/180 MP, recommend Mac Internet servers, and own a Sony PC. The Sony does not belong in the company of most of these machines. Sony is building a computer directed squarely at the home market. It's not a speed machine, and Sony does not promote it as such.

I know that articles must be prepared in advance, but the arrival of the Pentium II in May 1997 cannot be ignored. Dell and Compaq are now shipping 266MHz Pentium II-based computers for under \$3000. Even without the Pentium II, the PC should at least have been tested with a SCSI drive.

You cannot include a \$10,000 machine like the DayStar and fail to include dual-processor Pentium Pro machines. If you had chosen Intel-based machines that cost the same as the Macs, I think your test results would have been different.

Apple is better for the same reason a Mercedes-Benz is better than a Ford. It's just plain more fun to drive and a greater pleasure to own. No one is going to buy an Apple computer because it is a little faster this month, when we all know this will go back and forth between Intel and Motorola forever. Speed does not sell computers.

FRED KRUGHOFF
New York, New York

With the exception of the subjective video testing, we limited ourselves to objective, quantifiable test results from which to draw our conclusions. The concepts of value and usability, while important, weren't part of this story's equation. And while Macintosh users may not want to admit it, there are PC users who believe in the value and usability of their machines too.

As for what we did and didn't test, we didn't test any Intel multiprocessing machines because these are Windows NT-based systems that run specialized software with no Mac equivalent. Unlike the Mac multiprocessors, they are designed as servers, not for an individual user's desk. While such a test would have evened out the cost factor, there's really no way to compare these machines in performance because of the differences in functionality.

We received the prototype Pentium II from CompuLink late in the testing process, so we were able to incorporate it into the benchmark but not in much of the other testing.

And you're right that the Sony system is a solid PC, but not the fastest. However, by comparing the Sony's performance with that of other PCs (PC World, June 1997), we can tell that the Mac still would have outperformed faster PCs. The difference between the Mac and the Sony is greater than the difference between the Sony and other PCs.

Also, see "275MHz Mac Powerhouse" (September 1997) for the performance of the new G3 Macintosh. This machine runs about 50 percent faster than the fastest Mac we tested against the PCs. If there was still a question about which platform is faster, there certainly isn't now.—Ed.

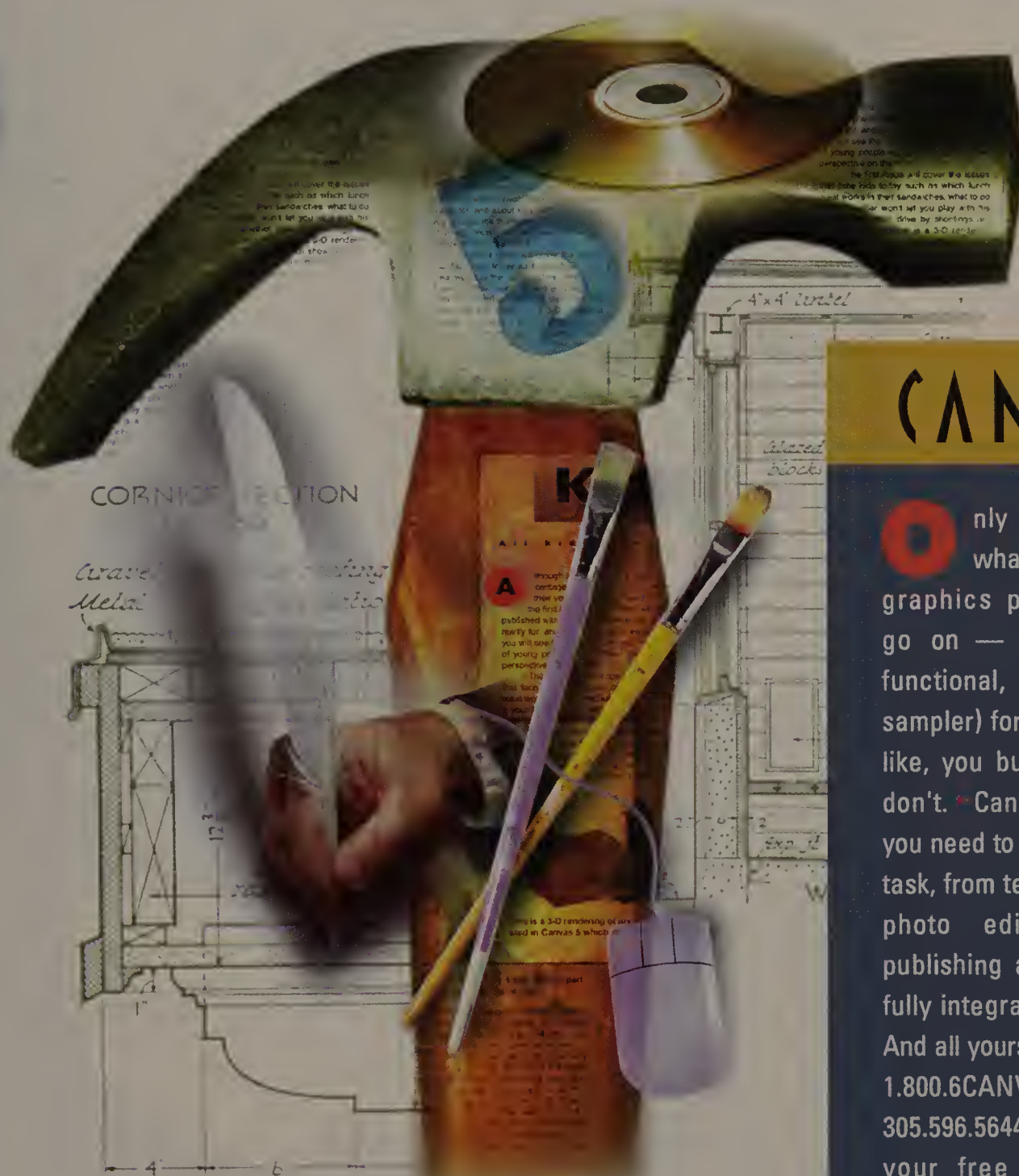
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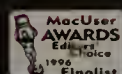
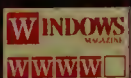
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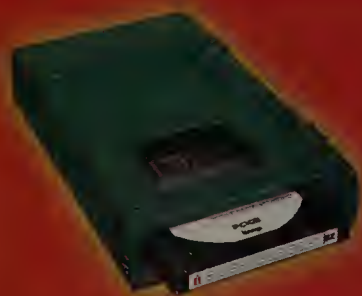
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BECAUSE IT'S YOUR STUFF.

to see the article on 17-inch monitors in the July issue ("17-Inch Screen Stars"). I was disappointed that you left Power Computing's 17-inch monitor out of the article when you have been recommending that system so highly.

CHRIS MAHAN
Seattle, Washington

The monitor that Power Computing offers is available only to purchasers of new systems. It is not available to the general public, or even to people who bought Power Computing systems earlier without a monitor. We did not review it because the vast majority of our readers would not be able to buy it. We will consider reviewing it as part of a Power Computing system bundle in the future.—Ed.

Emailer Edification

YOUR REVIEW OF CLARIS EMAILER 2.0 (July 1997) neglected to mention one very serious shortcoming of the program: by default it cannot display long e-mail messages over a certain length in its browser, and instead saves them to your downloads folder. You must then use a second application (not SimpleText, which cannot display messages greater than 32K) to view the message. Emailer is thus unsuitable for reading large messages such as most mailing-list digests.

JOHN WOO
New York, New York

The text limit for a single message in Emailer 2.0 is 64K of plain text, which is fairly long, so I don't think of the limit as a shortcoming. In fact, this is an increase from the previous 32K limit. I get hundreds of messages a week, including many mailing-list digests, but I probably get only a few that are too long and end up as enclosures. For those messages that are too long, you can write an AppleScript to automatically open the enclosure in a program like ClarisWorks.—Tom Negrino

How to Make a Mac Thrive

I JUST READ "MACS CAN THRIVE IN AN INT World" (News, July 1997). I have seen related articles before—they all say what *can* be done—but I have never seen an article on exactly how to connect a Mac to a PC. I can't seem to get an answer to two basic questions.

First, with a Power Mac 6100/60

(running System 7.5.5) on the same desk as a Windows NT machine, what are the *exact* software and hardware combinations needed to allow file sharing—from the most basic to more complex? What are the cost/capability trade-offs of various options? This may seem like a dumb question, but all I get for answers from dealers is what a specific product can do. From techies all I get is complex talk on what is possible to try.

Second, how do you handle file sharing with PCs over a network? Most networking people really understand either the PC or the Mac side—not both. Is this something I can handle on my own?

RONALD S. LEMOS
West Covina, California

Network data exchange between computers has two components: the physical network itself and the network protocol used to exchange information. The most popular physical network is Ethernet. You can easily set up an Ethernet network between a Mac and a PC ("Connect Your Workgroup," August 1997).

The Macintosh and Windows worlds have their own proprietary protocols, so one of the machines is going to have to speak the language of the other.

You can make your Mac speak Windows' networking language (IPX) using a product such as Thursby Software Systems' Dave (Reviews, May 1997), which makes the Mac look like a Windows machine to other users on a Windows network. Alternatively, you can make a PC look like a Mac running AppleTalk using a product such as Miramar Systems' PC MacLAN (Reviews, November 1996).

There are other, more costly and complex alternatives. You could use a Windows emulator on your Mac and gain all of Windows' networking functionality. Or you could run TCP/IP on all your machines using Unix Network File Sharing (NFS) for data exchange. Only you can decide if the increased cost and complexity are worth the additional capabilities you get.—Mel Beckman m

Letters should be sent to *Letters*, Macworld, 501 Second St., San Francisco, CA 94107; via fax, 415/442-0766; or electronically to CompuServe (70370,702), MCI Mail (294-8078), America Online (keyword *Macworld*), AppleLink (*Macworld1*), or via the Internet (*letters@macworld.com*). Include return address and daytime phone number. Due to the high volume of mail received, we can't respond personally to each letter. We reserve the right to edit all letters. All published letters become the property of *Macworld*.



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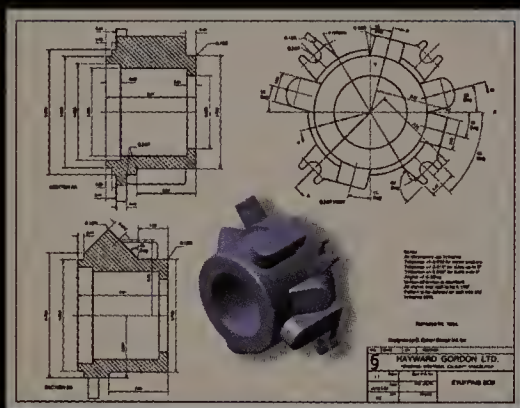
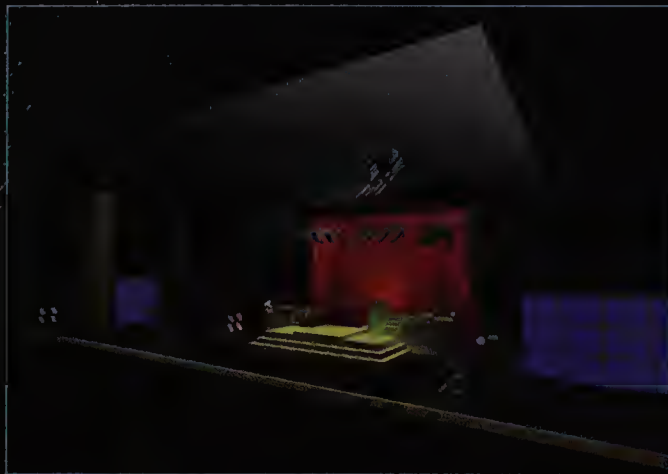
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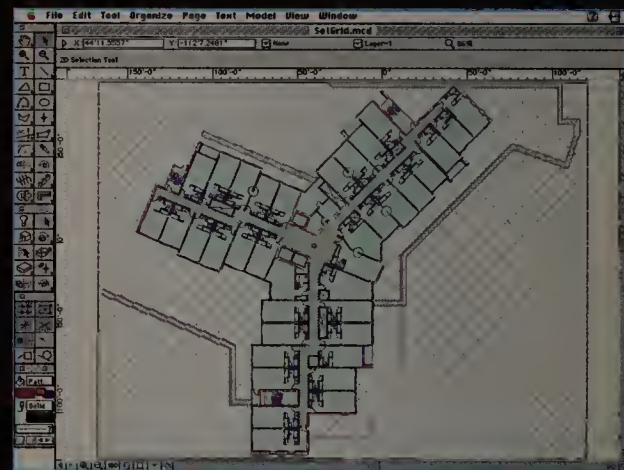
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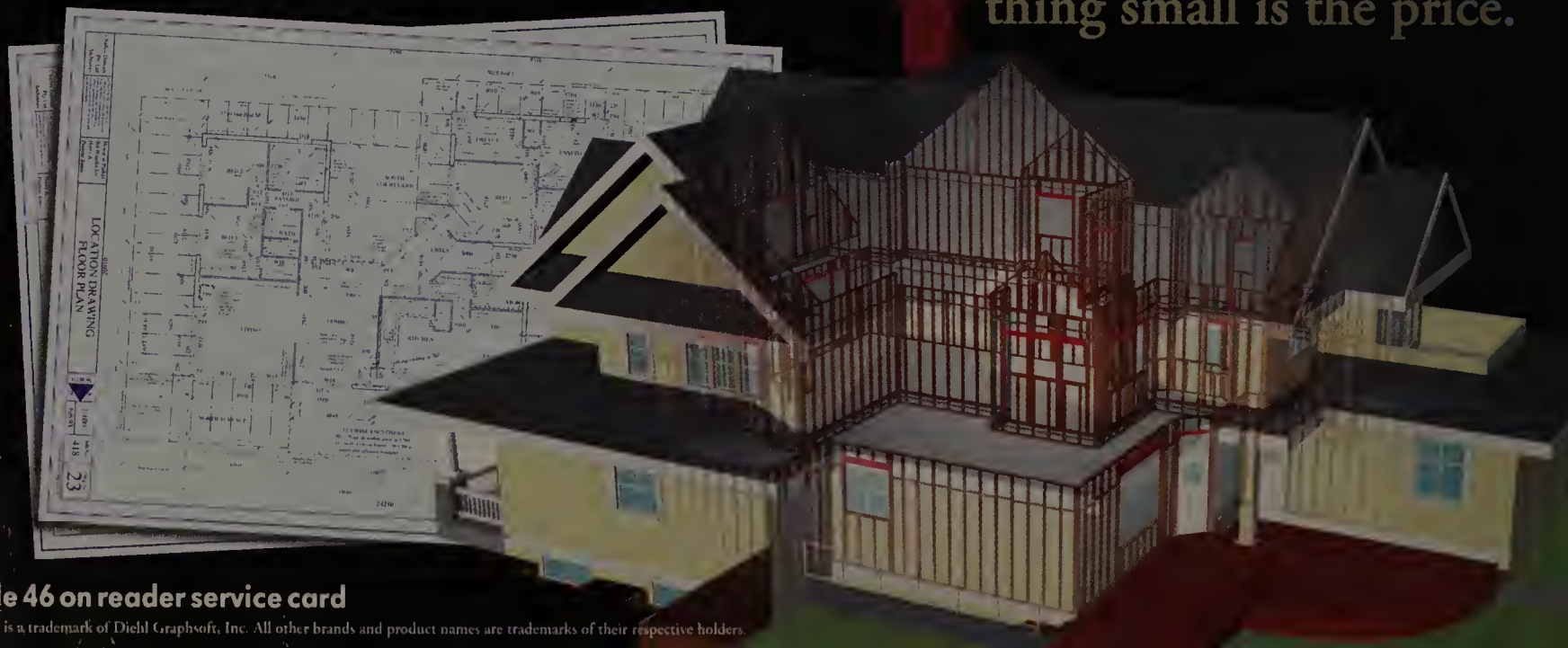
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State of the Mac

by Adrian Mello

Steve Jobs's Second Dynasty

WHY JOBS IS A GOOD CHOICE FOR CHAIRMAN AND WHAT IT MEANS FOR APPLE

BY THE TIME YOU READ this, Steve Jobs may have been named Apple's new chairman. I don't know for a fact that this will happen, but as I write this in late July, rumors of Jobs's ascension are abundant and the idea has a distinct logic. In any case, I'm going to go out on a limb and base this column on that assumption.

Even if he doesn't take an official role, Jobs now appears to be the prime force behind the company's direction. His influence is evident in many important decisions, and Apple executives appear nearly jubilant about his increased involvement. Naturally, questions arise about whether his increasing influence is good for the Macintosh and where it may lead. I am strongly in favor of Jobs's taking the chairman's role. Although I'm concerned about how he will handle issues such as licensing the Mac OS, I think the potential for good far outweighs the bad. Here's why.

Bold Thought and Action

Jobs has the charisma and vision to inspire Apple's employees, customers, and developers. If Apple employees are going to fight out the tough road to recovery, they need a leader they can believe in. Jobs has the energy and ability to focus a company so that it pursues a single-minded course of action. And after years of beleaguering, customers and developers need to feel there is a light at the end of the tunnel. Since Apple's troubles began, no one has painted a compelling picture of the Mac's potential for success.

Jobs also has the personality and instincts to deal with the almost overwhelming media exposure Apple receives. In the face of falling market share and poor financial results, Apple's recent leaders have been like deer caught in the

headlights. The result has been an ongoing black cloud over the Mac market, which has depressed sales.

Here's the most important point: Jobs is capable of bold thought and action. Apple needs a leader with unconventional vision who can play outside the rules. Apple can't be conservative, but must go for the long bomb to differentiate itself and grow. The last major move Apple made (apart from the Next acquisition) was the shift to PowerPC—arguably at a time when processors no longer provided significant product differentiation.



What Happens Next?

Some fear that Steve Jobs might undermine or abandon Apple's licensing program. At the World Wide Developers Conference in May, he said that Apple should license nearly everything but it must get a fair price. As I write, Mac OS 8 is released but licenses for it are unsigned. It makes me wonder if they ever will be signed.

Jobs may advocate building Intel-based Macs. It's rumored that he has already approached Advanced Micro Devices to discuss using its Intel-compat-

ible processors (which some might view as heresy). Jobs is hardware agnostic. He doesn't spend much time talking about hardware and he seems focused on enabling applications through software technology. Next gave up hardware some time back, and its progeny—the Yellow Box—runs on both Macs and PCs.

Jobs may be not only hardware agnostic, but also OS agnostic, at least for the part of the OS that is closest to the hardware and handles most basic operations and tasks. Jobs seems much more interested in those aspects of the operating environment that touch users and developers directly. Jobs emphasizes the Internet, and he may believe that the real growth opportunity centers on applying Web technologies to solve customers' problems.

Jobs may promote more direct marketing of the Macintosh. Direct sales have long represented the bulk of the market, and this method would allow Apple to reduce its costs so it could become more competitive. Power Computing has proven the effectiveness of selling Mac systems directly to customers.

In fact, there is a distinct possibility of a merger between Apple and Power Computing. Jobs could use Power Computing's brands to set apart Apple's direct-marketing efforts and to make a foray into Intel-based PCs. Besides, Joel Kocher, Power Computing's president, would be a great choice for Apple's next CEO. But I've already gone out far enough on a limb.

Stay tuned and tell me what you think will happen, at mello@macworld.com (if it hasn't already happened!). And keep an eye on Macworld Online (www.macworld.com) for up-to-the-minute coverage of changes at Apple. **m**



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News

Apple Forges Alliance with Microsoft

MICROSOFT DEAL, NEW BOARD OF DIRECTORS ANNOUNCED AT EXPO

by Stephen Beale

The scene was eerily reminiscent of the famous 1984 commercial that launched the Macintosh: hundreds of people sitting in neat rows, their attention focused on the chairman addressing them from a huge video screen. But this was no TV spot; it was Macworld Expo. The man on the screen was Bill Gates, and this time there was no hammer-wielding woman rushing forward to disrupt the proceedings.

Apple still lacks a permanent CEO, and the thorny issue of Mac OS licensing is unresolved. But under the leadership of de facto chief executive Steve Jobs, Apple now has a new relationship with longtime nemesis Microsoft, as well as a revamped board of directors.

"We have to let go of the notion that for Apple to win, Microsoft has to lose," Jobs said during his August 6 Macworld Expo keynote, adding, "The competition between

Apple and Microsoft is over as far as I'm concerned."

The new alliance has the following components:

- Microsoft will buy \$150 million in Apple stock and not sell it for at least three years.

- The companies have given each other a "perpetual cross-license" for their existing patents, allowing both to develop new products without fear of lawsuits over alleged

patent infringements.

- Microsoft's Internet Explorer will be the default Web browser for the Mac OS, but Apple will also ship other browsers with the system.

- The two companies will work to ensure compatibility between their Java virtual machines. Apple will support Microsoft's extensions to Java as well as Sun Microsystems' 100% Pure Java.

- Microsoft has made a five-year commitment to releasing new Mac versions of Microsoft Office. Over that time, Macintosh users will see the same number of major upgrades as Windows users. Speaking through a satellite connection, Gates said that Microsoft Office 98 for the Mac will ship by 1998. He added that, in some ways, the Mac version will "be more



ALAN MAZZETTI

advanced than what's on the Windows platform."

A New Board Jobs, who has essentially been running Apple without an official title since Gil Amelio's resignation as CEO, announced that he has joined a revamped board of directors that now includes experienced hardware and software industry veterans. Also named were Larry Ellison, CEO of Oracle; Jerry York, former chief financial officer of IBM and Chrysler; and Bill Campbell, CEO of Intuit and former head of Claris. Du Pont chairman Edward Woolard and Hughes International president Gareth Chang remain from the previous board. Gone is longtime director and former Apple chairman A. C. Markkula, an Apple cofounder.

The Jobs Saga The Expo announcements capped a bizarre two weeks during which Jobs denied widespread rumors that he was about to be named Apple chairman. In a memo to employees at Pixar, Jobs's computer animation company, he said that he had been offered the CEO and chairman positions and had turned them both down. It was also a time when Apple's testy relationship with its Mac OS licensees nearly became open warfare (see "Mac OS 8 Ships with No License Deal," in this section).

New Directions In his keynote, Jobs said that Apple will focus more attention on the education and content-creation markets. The company will also work more closely with major developers, such as Adobe Systems, on comarketing deals and efforts to make key applications run better on the Mac.

Apple is shifting public emphasis from Rhapsody, its next-generation operating system, to the Mac OS, so people don't think Apple has abandoned the Mac OS. (Jobs

didn't even mention Rhapsody in his keynote speech.) Sales of Mac OS 8 have shot through the roof, Jobs said, with 1.2 million copies sold less than two weeks after its July 26 release.

Although it was not announced at Expo, sources close to Apple say that Jobs has been working with Apple engineers to develop a low-cost network computer (NC) that could ship as soon as Christmas. Ellison, now on Apple's board after considering a takeover bid earlier this year, has been a big NC advocate.

Another likely change is an aggressive move into direct sales of Mac systems, à la Power Computing. The Mac market has shifted largely to catalogs and other forms of direct marketing, but until now, Apple has not aggressively pursued direct sales.

Good or Bad? Jobs's recent involvement with Apple has generated much excitement among users, vendors, and Apple employees, and he has filled the leadership void left by Amelio's departure. However, in his opposition to Mac OS licensing, Jobs has seriously damaged Apple's relationship with its licensees, and his looming presence complicates the search for a strong CEO. Bill Gates, Larry Ellison, and other industry veterans may be on board, but it remains to be seen whether these latest changes can help stop Apple's slide into obscurity.

Macworld

BEST of SHOW

Macworld editors
pick the hottest new
products introduced at
Macworld Expo in
Boston. See page 38.



Epson's \$12,999 PowerLite 7000 offers 1024-by-768-pixel resolution.

display

Projectors Offer Higher Resolutions

TRADE-OFFS ARE DIMMER PICTURE, MORE WEIGHT

by Andrea Dudrow

With notebook computers promising higher screen resolutions, some vendors of LCD projectors are racing to keep up with the burgeoning ranks of mobile presenters by offering 1024-by-768-pixel resolution.

But that sharper picture usually comes at the expense of brightness or portability. That's because most 1024-by-768-pixel projectors use three LCD panels, compared with one typically found in 640-by-480-pixel and 800-by-600-pixel models, and the additional panels make it harder to force light from the projector. Larger LCD panels can boost brightness but require a heavier case.

A projector's brightness is measured in lumens: for small to medium-size rooms, 400 to 600 lumens is adequate. Contrast ratio determines picture clarity; all rank at or above the accepted range of 100:1.

High Res at a Price You will soon be seeing 1024-by-

768-pixel projectors from Epson (310/782-0770, www.epson.com), InFocus (503/685-8888, www.infocus.com), Mitsubishi (714/220-2500, www.mitsubishidisplay.com), NEC Technologies (630/775-7900, www.nec.com), and Sharp (201/529-8200, www.sharp-usa.com).

Epson's \$12,999 14.5-pound PowerLite 7000 connects directly to your Mac and offers 400 lumens of brightness with a 300:1 contrast ratio. InFocus's \$11,999 12-pound LitePro 730 has a Mac-compatible input port and offers the same brightness plus full-motion video.

Sharp's \$12,995 600-lumen XG-E3000U includes a Mac adapter, but at 30.8 pounds it's almost twice as heavy as many less-bright 1024-by-768-pixel models. Mitsubishi's \$11,995 LVP-X100 has the same brightness in a 20-pound case; you can save your presentation on a flash-memory PC Card and play it directly from the projector. A Mac adapter is included. Also \$11,995 is NEC's 15.9-pound 450-lumen MultiSync MT1000, which plugs directly into your Mac.

Brighter Picture, Fewer Pixels

If high resolution isn't your top priority, consider one of the more portable 800-by-600-pixel projectors from ASK LCD (201/896-8888, www.ask.no), NEC, Philips (770/821-2400, www.philipslcd.com), Polaroid, and Sharp. These models usually produce brighter images than their 1024-by-768-pixel cousins.

ASK LCD is updating its 800-by-600-pixel Impression 8300 using Texas Instruments' DLP (Digital Light Processing) technology (see "Mirror, Mirror on the Wall," *News*,

continues

Sneak
PEEK

QuarkXPress Makes Moderate Leap

BY GALEN GRUMAN

Coming nearly four years after the last major upgrade, QuarkXPress 4.0 is not the radical revision you might expect of the top page-layout program. But with version 4.0, Quark (303/894-8888, www.quark.com) does target several areas for significant new functionality.

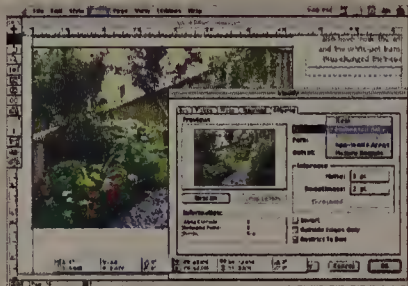
Graphics-Friendly A slew of Bézier drawing tools let you create moderately complex illustrations within QuarkXPress. Better, you can create text and picture boxes with Bézier tools; these boxes let you mask imported images and set up "columns" of type with unusual shapes. You can also convert single lines of text into picture boxes, so you can use text as an image mask or an easily editable Bézier shape.

The artistically inclined will also love the new clipping-path features. The program can use a TIFF image's alpha channel or clipping path to generate a clipping path within a Quark document, letting you create form-hugging text wraps around images. If your graphic doesn't include such an outline, QuarkXPress can create its own clipping path by masking out all white areas in the image—a neat trick. And however you got a clipping path for that image, QuarkXPress lets you edit it.

More Styles Perhaps the most useful changes are the new character styles capability—which lets you assign formatting to pieces of text, not just to whole paragraphs—and the inclusion of the formerly separate QuarkPrint plug-in, which lets you manage your print jobs more easily. However, I wish that creating character styles was a little easier. But I simply adore the new Append feature that lets you selectively append style sheets, colors, hyphenation settings, booklists, dashes, and stripes from other QuarkXPress documents—what a great idea!

Quirks in QuarkXPress I did find some oddities in the beta I tested, although these may be resolved in the final version, due out this fall for \$895. One is that you lose most image controls on imported bitmapped images if 32-bit preview is selected; at lower preview resolutions, all controls are available. Another is the lack of support for Mac OS 8's contextual menus, a feature the Windows version includes.

All in all, QuarkXPress 4.0 is a strong upgrade, despite the fact that the layout features, typography tools, and basic organization remain largely untouched. The new features are well designed, and every QuarkXPress user will find many of them appealing.



QuarkXPress 4.0 lets you import or create clipping paths for graphics.

March 1996), which the company claims won't sacrifice brightness or portability. Expected to cost \$8995, it offers 600 lumens of brightness and will ship with a Mac adapter. ASK LCD's \$9495 Impression A4 includes a Mac cable and features 500 lumens in an 11-pound package.

Sharp's \$8995 600-lumen XG-E1200U weighs 30.8 pounds and comes with a Mac adapter. At 21 pounds, Polaroid's (617/386-2000, www.polaroid.com) \$6995 600-lumen Polaview 211 weighs almost twice as much as its predecessor, the Polaview 10. Polaroid will supply a Mac cable if you ask for one.

For \$8495 you can get NEC Technologies' 15-pound MultiSync MT810, which stores up to eight images, puts out 550 ANSI lumens, and doesn't require an adapter.

Philips's ProScreen 4000 and ProScreen 4100 both ship with Mac adapters, weigh 17.5 pounds, and use a UHP (Ultra High Performance) lamp, designed to minimize brightness loss over time.

The \$6695 300-lumen ProScreen 4100 offers 800-by-600-pixel resolution, while the \$5500 350-lumen ProScreen 4000 features 640-by-480-pixel resolution.

Not Too Bright, but Light With Lightware's (503/641-7873, www.lightware.com) and Telex Communications' (612/884-4051, www.telex.com) new releases, you trade brightness for lightness. Lightware's 9.45-pound MVP800 features 800-by-600-pixel resolution, a relatively dim 275 ANSI lumens, and a pop-up lens for \$6995. If your Mac doesn't have a VGA video port, you'll need to buy an adapter. Telex's \$5995 800-by-600-pixel Firefly P350 puts out 250 to 300 ANSI lumens in a 9-pound case that collapses to 2.7 inches when not in use. The package includes a Mac adapter.

graphics

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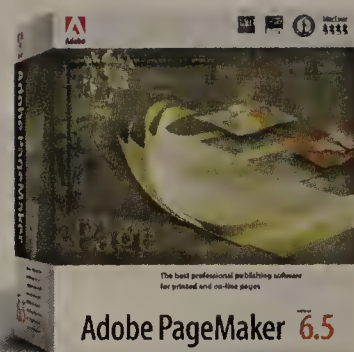
by Stephen Beale

The Macintosh could soon be playing a more prominent role in film and television production thanks to Commotion, a new video-painting program created by a visual-effects supervisor at Industrial Light & Magic. Scott Squires developed the software over the past six years for his own work at the renowned special-effects house and has established a company called Puffin Designs (415/331-4560, www.puffindesigns.com) to market the package.



Don't Do This at Home Scheduled to ship in August for \$2495, Commotion aims squarely at film and video professionals. It has most of the features you'd expect in a sophisticated image-editing program, but rather than being oriented toward still images, it is designed for use with video or film clips. Squires's goal was to provide an alternative to proprietary graphics workstations, such as

continues



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the Quantel Video Paintbox, that carry six-figure price tags.

Adobe Photoshop users who run Commotion will find themselves in familiar territory. The program includes painting and selection tools, alpha-channel compositing functions, and a basic set of image filters. But it implements these features within a multiple-frame environment. You can import QuickTime movies or numbered PICT files and apply the effects to a selected range of frames. The uncompressed film or video clips are loaded into a playback window, letting you preview the effects in real time as you create them.

Super Clones One unique feature is the Super Clone brush, which lets you clone images among multiple frames. As you work on a frame, you can invoke an onion-skinning feature that lets you see faded versions of preceding frames. Rotosplining functions let you create sophisticated masking effects among multiple frames. Commotion also includes a wire-removal function, essentially a line tool that erases.

Within Hollywood, Unix and Windows NT continue to be the platforms of choice for high-end 3-D graphics work. But Commotion demonstrates that the Mac still has an important role to play among the creative professionals who transform a director's imagination into cinematic reality.



Commotion's Super Clone feature lets you replicate images across multiple frames.

graphics

More Cameras on Parade

NIKON, OLYMPUS, AND
EPSON ANNOUNCE
THEIR LATEST MODELS

by Stephen Beale

The onslaught of new digital cameras continues with recently announced consumer models from Olympus America (516/844-5000, www.olympus.com), Epson (310/782-0770, www.epson.com), and Nikon (516/547-4200, www.nikonusa.com).

Two from Olympus Olympus has introduced the D-220L and D-320L, succes-

sors to the D-200L and D-300L, respectively. Both cameras feature smaller designs than their predecessors', along with removable media and a video-output port that lets you view images on a TV.

Images are stored on Solid State Floppy Disk Cards (SSFDCs); a 2MB card is included in the package. The \$499 D-220L features a maximum resolution of 640 by 480 pixels, while the \$699 D-320L offers 1024 by 768 pixels.

Both Olympus cameras can print directly to the company's new \$399 P-300 dye-sublimation printer, which produces 300-dpi continuous-tone prints on 4-by-5½-inch paper. The cameras are scheduled to ship in September; the printer, in October.

Going for the Pixels Epson's \$799 PhotoPC 600 features 1024-by-768-pixel reso-

lution, with a digital zoom feature that captures enlarged images at 640 by 480 pixels. Images can be stored on SSFDC media and downloaded through a serial port.

A video-output port lets you display images on a TV, and you can upload presentations to be played directly from the camera.

Annotate Your Pix Nikon's CoolPix 300 Personal Imaging Assistant features a touch-screen LCD and stylus, allowing you to superimpose handwritten notes on an image. You can also use a built-in microphone to add up to 17 minutes of voice annotations.

The \$699 camera offers 640-by-480-pixel resolution and can capture live video at 30 frames per second.

networking

An Eye for Your Macintosh

CHEAP CAMERAS FOR
VIDEOCONFERENCING
HIT THE MAC MARKET

by Keith Mitchell

Some see videoconferencing as a great way to hold business meetings without the hassle of travel. Others just want to show relatives back home the new sweater they bought. Whether your interest is business or pleasure, a host of new inexpensive videoconferencing cameras have hit the market.

Video on the Go Howard Enterprises (805/383-7444, www.howent.com) and irez (612/939-9299, www.irez.com) have announced cameras designed specifically for laptop computers. Howard's \$417 HA6800 TeleCam LT can be clipped

continues



Mitsubishi Scanner Does Double Duty

It may look like a scanner, but it's also a mass-storage device. Aimed at document-archiving applications, the SS600 from Mitsubishi Chemical America (408/954-8484, www.mitsubishi-infostorage.com) incorporates a 300-by-600-dpi flatbed scanner along with your choice of a 640MB magneto-optical or 2×/6× CD-Recordable drive. The scanner offers 24-bit-color image capture and scans up to 20 pages per minute. The \$2500 price includes a 50-page automatic document feeder.—STEPHEN BEALE

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ClarisWorks Gets Its Own Office

BY STEVE SCHWARTZ

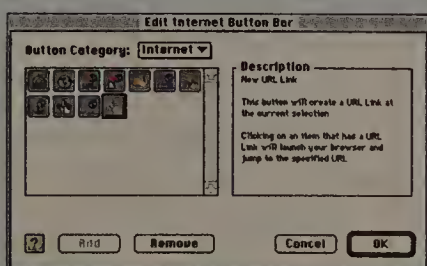
With version 5.0 due in September, ClarisWorks gets a promotion and a new title: ClarisWorks Office. A bundle that adds Claris Home Page Lite, Netscape Navigator, business templates, and clip-art images, Office will be the official retail product. Not available separately except as an upgrade, ClarisWorks 5 offers only two significant new features—button bars and document links—but includes numerous minor enhancements.

Buttons and Links Replacing the Shortcuts palette, the button bar lets you quickly execute commands relevant to whatever environment you're in. Customization options include specifying the bar's placement (top, right, left, bottom, or floating), adding and removing buttons, creating your own bars, and designing and assigning macros to buttons. Regardless of which bar is currently displayed, you can switch from one bar to another using a drop-down menu.

Power users will appreciate the ability to create three types of links in Office documents: menu-accessible bookmarks, document links (clickable text or graphics that move you to a bookmark in the same document or that open another document), and URL links to Web sites. You can create links from selected text, an object, a paint image, spreadsheet cells, or document frames. Using links, you could make a live table of contents for a report or enable readers of a memo to jump to related information on the Web, for example.

Multimedia and Graphics Other useful—but undramatic—additions include password protection for documents; context-sensitive help for dialog boxes; the ability to drag and drop text and objects between documents, programs, and the desktop; named, as opposed to numbered, cell ranges in spreadsheets; an integrated equation editor; better alignment of objects embedded in word processed text; a multimedia database field type; a texture palette; a ClarisWorks Assistant for designing business cards; and an Open Scripts Folder menu for easy access to ClarisWorks-related AppleScripts.

Owners of previous versions can upgrade to ClarisWorks 5.0 alone for \$49; to get the add-ons you'll have to buy the Office bundle for \$99 and apply for a \$30 rebate.



You can customize ClarisWorks' built-in button bars or create your own by adding and removing buttons.

Although ClarisWorks 5 is a solid, well-designed program, its upgrade value is questionable. Serious Internet users will probably find it worthwhile, but the add-ons and minor enhancements may not be enough to entice the typical user.

onto the open screen of a PowerBook. It features a built-in microphone, a zoom lens, automatic white balance, and manual and automatic focus.

The \$349 Kritter, from Irez, was developed for the PowerBook 2400 and 3400. It uses a technology called ZoomedVideo—available through an included PC Card—to send images directly to the laptop's video buffer, bypassing the system bus to speed performance. It is bundled with Kai's PowerGoo, Kai's Photo Soap, and videoconferencing software.

For the Desktop Toshiba (714/583-3000, www.toshiba.com/pccam/) and Panasonic (201/348-7000, www.panasonic.com/alive/) both offer videoconferencing cameras that work with desktop computers in addition to laptops.



Panasonic's EggCam is bundled with CUSeeMe software.

Toshiba's \$139 IK-MM1 can capture video at 30 frames per second with 512-by-492-pixel resolution. Compatible with most videoconferencing boards and software, it can be used for videoconferencing, video e-mail, and video capture for Web pages.

Panasonic's \$129 EggCam was designed for video e-mail on Windows, but can also be used as a videoconferencing camera for the Mac. It is bundled with CUSeeMe software and produces images at 542-by-496-pixel resolution.

systems

Apple Gets Enterprise Boost from CA

COMPANIES ANNOUNCE

JASMINE INTEGRATION

by Stephen Beale

Computer Associates (516/342-5224, www.cai.com), a major developer of corporate data-management and enterprise computing software, has given Apple a boost on two fronts by announcing that it will integrate Jasmine, its new object-oriented database package, with Rhapsody, Apple's next-generation OS. The move represents an endorsement of Rhapsody by a large software vendor and could enhance Apple's presence in the enterprise computing market.

Corporate Multimedia Jasmine is an object-oriented database package that includes multimedia authoring tools, allowing programmers to create media-rich applications for corporate networks.

Under the agreement, the companies will ensure that applications created with Jasmine will run in all software environments supported by the Rhapsody Yellow Box, including the Mac OS, Windows, and Rhapsody itself. Programmers will also be able to use the object-oriented authoring tools in the Yellow Box to create applications that interact with Jasmine databases. The Yellow Box is the portion of Rhapsody that will include such features as preemptive multitasking and protected memory.

For Apple to reap the full benefits of the deal, Jasmine will have to succeed in the cor-

continues

Unbelievable Ease of use

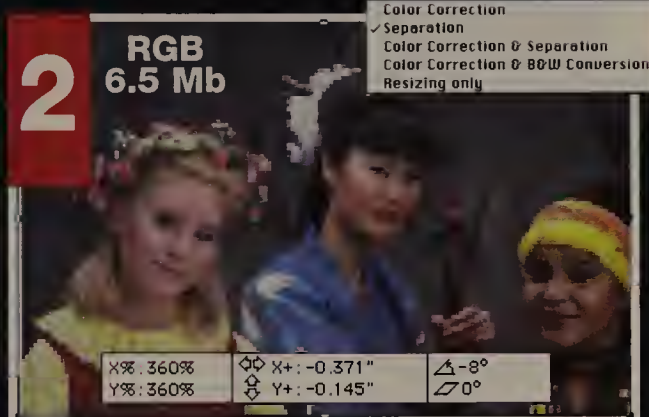
Don't be concerned about the resolution, size, horizontality and color correction and mode. Just import images in the Quark image box from a Photo CD disk or from a raw scan. Position them however you want using QuarkXPress's tools. For each, send orders with the processing options to the IPM.

I import my pictures in my QuarkXPress document's image boxes



TIFF, EPS JPEG or Photo CD ImagePac; RGB, YCC, grayscale or CMYK. This image was scanned from a 35 mm original in RGB raw mode at 100% size on a PowerLook 2000 flatbed scanner at its optical resolution of 1000 dpi.

I position them using the XPress tools and I select processing options using the binuscan Xtension

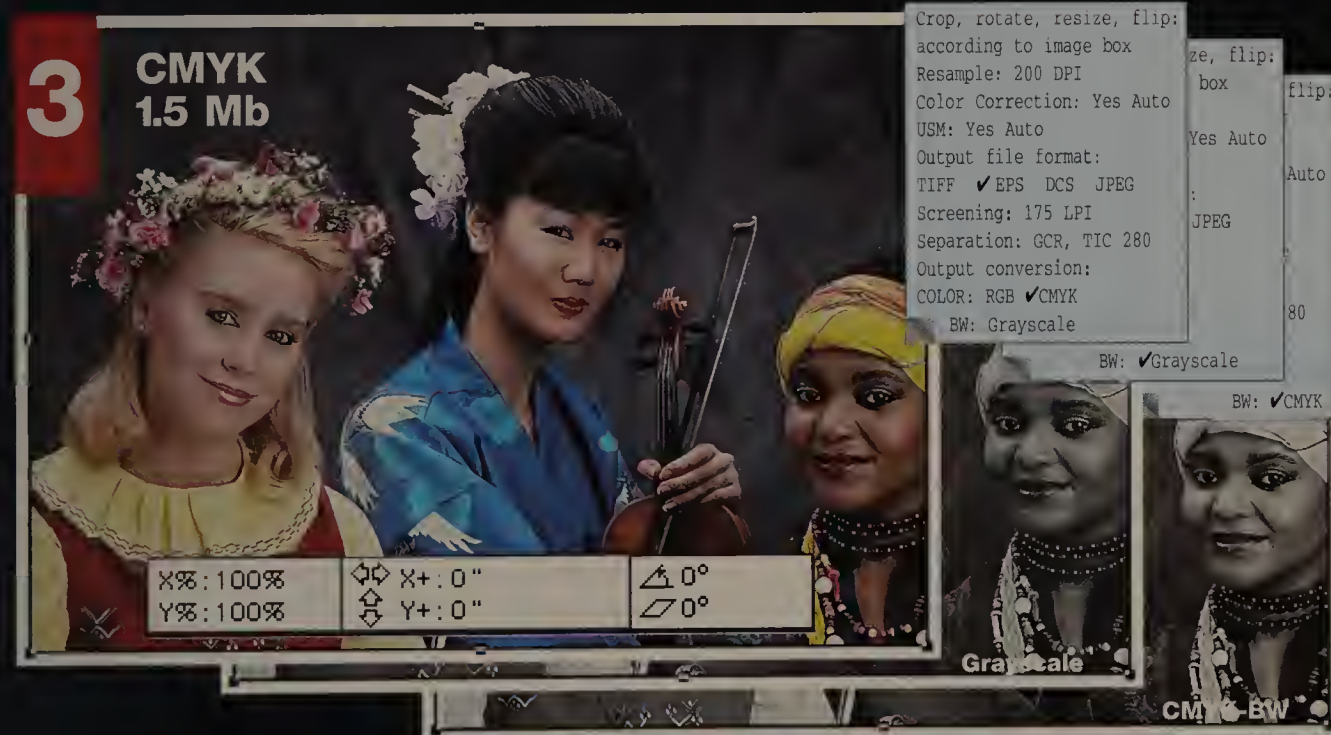


The client XTension writes the "order list" then sends it to the IPM for processing. It includes the values entered in the QuarkXPress "measurement bar" plus the processing and output options set in the XTension's user interface.

Phenomenal Productivity

A catalog with hundreds of images that may require several people a week's worth of work can be processed and ready to output in just a few hours. Processing can take place overnight, even on a low-end desktop computer, with little RAM.

After processing, the new recalculated images are re-imported in the desired color mode with the right amount of pixels... automatically



From a single RGB file, those CMYK, grayscale or CMYK-BW processed images will output at a blazing speed, due to their optimization.

Astonishing Quality

Each processing algorithm uses state-of-the-art technology. Even when the IPM is used only to resize images previously color corrected and separated, the screen preview is recalculated with colors and a sharpness that are truly impressive. No more surprises on the color proof!

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THE SERVER APPLICATION

"binuscan IPM" (Image Processing Machine) works in the background, using the processor only when it's free. It recalculates a new image based on the original and a list of orders generated by a client application. This "order list" contains all the user's output preferences, including (but not limited to) CMYK separation specs, automatic color correction instructions, and sharpening levels, as well as any other modifications made to the image (crop, flip, rotate, resize, etc.) by the client application. binuscan achieves an impressive high and consistent quality every time because the IPM bases its processing algorithms on an individual histogram analysis of every image.

THE CLIENT APPLICATION

Many client applications can be used to generate "order list" text files and save them into the IPM's "TO DO" folder for processing. binuscan's open architecture allows third party developers to write custom client applications. The binuscan ColorPro® package includes the binuscan IPM® plus client applications to acquire images from scanners or Photo CDs and binuscan Job-Manager® (a Quark XTension) which works as described to the left.

THE PERSONAL TOUCH

binuscan ColorCorrect is a utility included with the IPM which allows you to create ghost effects or "sepia effects" and harmonize the images on your page. This utility will perform color adjustments to processed images by writing PostScript functions to the image file. Modifications are written then updated in your page layout in seconds, no matter how large the files are. Every modification can be reverted with the same ease and in the same manner.

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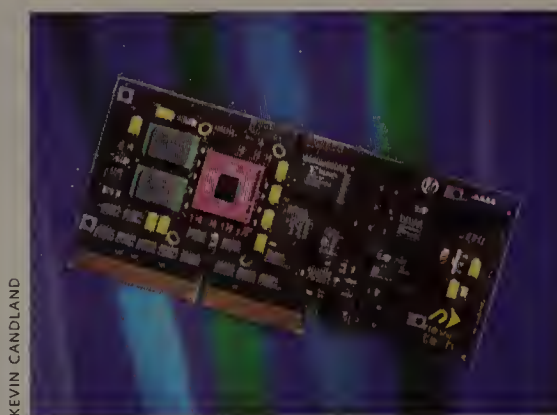
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porate market, an outcome that is not assured. Jasmine targets large data-management applications currently handled by relational databases, and corporations tend to be cautious when making technology transitions in such mission-critical areas. However, Jasmine's media-authoring and object-oriented programming capabilities will likely be strong attractions for corporate customers who want to move multimedia content over their networks.

Unicenter Unified The companies also announced that they will integrate the Mac OS and Rhapsody with Computer Associates' Unicenter TNG, an enterprise computing infrastructure that allows administrators to manage networks, applications, and databases within a single framework.

By year's end, Computer Associates plans to release software that permits Unicenter TNG to monitor CPU usage, drive failures, and other conditions of Mac systems connected to corporate networks. Apple plans to offer software that will allow Macintosh users to control Unicenter TNG's system-administration functions through a Web-browser interface.



KEVIN CANDLAND

Newer's MaxPowr Pro CPU upgrade will offer speeds up to 275MHz.

systems

Newer CPU Card Sports PowerPC 750

MAXPOWR PRO BOOSTS

MAC PERFORMANCE

by Howard Baldwin

As the new PowerPC 750 CPU comes to market with its zippy backside cache, Newer Technology (316/943-0222, www.newertech.com) plans to ship upgrade cards for the Power Macintosh 7300, 7500, and other

CPU-upgradable models. Newer plans to ship its MaxPowr Pro CPU upgrades in late August at 250MHz and 266MHz speeds with either 512K or 1MB of backside cache. Macworld Lab tests on a prototype 270MHz version showed that the upgrade pushes the Power Mac 7500

and 7300 past any current 604e system (see below). Pricing has not been determined.

Newer also announced its Nupowr 500/183c PowerPC upgrade card for PowerBook 500 computers, which replaces the 68LC040 processor originally used in the PowerBooks. It uses the low-voltage 183MHz PowerPC 603ev processor, and sports 128K of external cache. Also included is a Control Panel that lets you turn off the cache without rebooting the system, for maximum battery life.

The 500/183c will be available without RAM for \$850 or with 16MB of RAM for \$1063. The 16MB version hangs over into the internal modem space.

systems

Mac OS 8 Ships with No License Deal

A SLAP IN THE FACE

TO MAC OS LICENSEES

by Stephen Beale

On July 26, Apple reached a long-elusive milestone: it finally shipped a major upgrade to the Macintosh Operating System. Mac OS 8 may be modest compared with the forthcoming Rhapsody—or the defunct Copland—but as Apple software chief Avie Tevanian proudly observed, “We shipped it on time, with the features we promised, and with very high quality.”

Unfortunately, July 26 was also an ominous milestone for Mac OS licensing. Because the day passed with no new licensing agreement in place, Power Computing, Umax Computer, Motorola,

continues



MaxPowr Pro Reenergizes Older PCI Machines

Based on the superfast PowerPC 750 (also called G3) CPU, Newer Technology's MaxPowr Pro 270 propelled the Power Mac 7500 and 7300 past any current 604e-based Mac. This prototype 270MHz card had only a 512K Level 2 backside cache. Newer will initially ship 250MHz and 266MHz versions.

■ Best overall performance. Longer bars are better. Bold indicates best result in test. ► New product. An Apple Power Macintosh 7100/80 has a SpeedMark score of 1.0.

		SpeedMark					
		CPU	FPU	Disk	Video	Star Rating	
Power Computing PowerTower Pro G3/275 prototype	5.1	5.9	5.2	2.8	9.4	not shipping	
► Newer Technology MaxPowr Pro 270 with 7500/100	4.2	5.0	4.6	2.1	5.0	not shipping	
► Newer Technology MaxPowr Pro 270 with 7300/200	4.1	4.9	4.5	1.8	4.9	not shipping	
Power Computing PowerTower Pro 250	3.6	3.9	3.8	2.5	7.6	★★★/6.2	
Apple Power Macintosh 9600/233	3.3	3.5	3.4	2.3	6.9	★★★/6.6	
Apple Power Macintosh 8600/200	2.7	3.0	2.9	1.9	3.6	★★★/6.5	
Apple Power Macintosh 7300/200	2.6	2.9	2.9	1.6	3.6	★★★/5.9	

Behind Our Tests

For detailed information on our systems benchmarks, see *Mac Superguide*, September 1997, or www.macworld.com/tests/.—Macworld Lab testing supervised by Mark Hurlow

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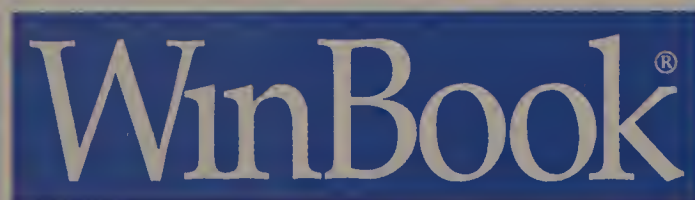
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and other licensees could not ship Mac OS 8.

The practical impact was limited because licensees could still buy retail copies of Mac OS 8 for inclusion with their systems, but Apple's relationship with its Mac OS licensees has reached a new low. This became apparent at the early August Macworld Expo in Boston, as Power Computing, fearing that Apple may try to eliminate the licensing program, tried unsuccessfully to foster a mass protest of the company's licensing policies.

Close, But . . . Shortly before Gil Amelio's July 9 resignation as CEO, Apple and the licensees appeared close to a new licensing deal. A tentative agreement, dated June 18, was included in legal documents filed with the Securities and Exchange Commission in connection with Power Computing's forthcoming initial public stock offering. The proposed agreement represented a compromise on several points:

- Apple would allow OS licensees to offer PowerBook clones, first through extensions to the Mac OS, and later through a Common Hardware Reference Platform (CHRP) specification for notebook computers.

- Licensees would pay royalties for each Mac OS system on a sliding scale, with the most powerful systems commanding higher royalties than more modest configurations. Licensees would pay lower royalties for markets in which Apple has not been successful. The exact fees were unspecified, but the *San Jose Mercury News* reported in July that the maximum royalty for a single-CPU system would be \$200.

- Apple would require licensees to submit CHRP systems for technical evaluation and Mac OS certification.

Licensees would submit sealed systems to prevent Apple engineers from learning about any hardware innovations inside. Certification would be based on a standard test suite.

Apple said it will routinely complete the technical evaluation within two business days, and OS certification within five business days. The licensees have said that Apple's current certification system thwarts their ability to innovate and is sometimes used to delay competing products (see "Possible Hope in Licensing Fracas," *News*, September 1997).

Apple will not publicly discuss the negotiations or the reasons for the delays in reaching an agreement. But Apple executives have said that licensees are taking business away from Apple without

expanding the Mac market.

At the July 22 press conference announcing the release of Mac OS 8, Apple marketing chief Guerrino De Luca said that the company hoped to have a completed agreement "as soon as possible." Previously, De Luca had said he expected a deal by the time Mac OS 8 shipped.

Expo Ruckus The conflict over licensing nearly reached the boiling point at Macworld Expo. As attendees walked into the opening keynote featuring Steve Jobs, Power Computing employees passed out "Freedom of Choice" signs, hoping that the audience would launch a protest if Jobs openly attacked the licensees. Jobs—who has been functioning as Apple's de facto CEO—did not mention

BREAKING NEWS

FOR THE LATEST
COVERAGE OF THE
CHANGES AT APPLE
COMPUTER, SEE
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.COM/DAILY/.

licensing, but was clearly referring to the licensees when he characterized some of Apple's business partnerships as "destructive." Power Computing and the other licensees fear that Apple has quietly decided to stop certifying new systems and render their contracts unusable.

Later, during a keynote session highlighting new Mac systems, Power Computing president and COO Joel Kocher lambasted Apple for its failure to complete the negotiations. "Apple is reversing its position on an open platform," he said. However, the angry tone of his remarks alienated some attendees. Representatives from Umax and Motorola who were also on the panel took a more positive approach, touting the benefits of their systems rather than attacking Apple.

New Hostility Apple has long been ambivalent toward the concept of OS licensing. But with Jobs calling the shots, ambivalence has become open hostility. Lamar Potts, who headed Apple's licensing program before resigning last April, says that Apple has a contractual obligation to allow the licensees to offer Mac OS 8. However, because Apple can set fees and other conditions, Potts says, the company has the ability to make licensing an untenable business proposition.



ARNOLD TIOSEJO

Printer Puts Color Photos on Laser Paper

New from Alps Electric (408/432-6000, www.alpsusa.com) is the \$389 MD-1000, the latest in a line of color printers using the company's MicroDry inks. The MD-1000 lets you produce color photographs at 600 dpi on paper stocks designed for laser printers. It will also print on transparencies, greeting cards, T-shirt transfers, and backprint film. The Mac version uses a SCSI interface and is bundled with Adobe Systems' PhotoDeluxe image-editing software. In addition to standard color inks, you can use metallic inks and a new white ink for printing on colored papers. Standard inks cost \$7 per cartridge; metallic and white inks cost \$10 per cartridge.—STEPHEN BEALE

Additional reporting by ELIZABETH DOUGHERTY and GALEN GRUMAN.

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The competition was fierce, but *Macworld's* editors have again selected the hottest new products introduced at Macworld Expo in Boston. We were pleasantly surprised this year to see an especially large crop of hardware and software deserving Best of Show consideration. To be eligible, the product had to be brand-new—announced for the first time at, or shortly before, Macworld Expo. We also had to see the product in action, although software evaluations were often based on beta versions.

StarMax Pro 6000/300

This speedy Common Hardware Reference Platform (CHRP) system from Motorola Computer Group (800/759-1107, www.mot.com/starmax/) is one of the first Macs to include the PowerPC 750 CPU, and also features a 66MHz system bus. In Macworld Lab tests, a prototype 300MHz StarMax Pro 6000 outran its closest competitor by nearly 10 percent overall. The system is expected to ship in October; 233MHz and 266MHz versions are scheduled to ship in September. (See "Upstart Macs" in this issue.)

PowerTower Pro G3/275

The latest high-end system from Power Computing (512/388-6868, www.powercc.com) continues the company's tradition of squeezing the most performance out of existing designs. It takes the Tsunami motherboard found in competing systems and makes it zoom, using a PowerPC 750 CPU and a backside cache in a 1:1 ratio—the fastest implementation possible. You also get 64MB of RAM, a 2GB or 4GB hard drive, and an 8MB IXMicro TwinTurbo graphics card. (See "Upstart Macs" in this issue.)

MaxPowr Pro

This CPU upgrade from Newer Technology (316/943-0222, www.newertech.com) is the first to include the speedy new PowerPC 750. Newer plans to ship the upgrades in late August at speeds from 233MHz to 275MHz and with either 512K or 1MB of backside cache (see "Newer CPU Card Sports PowerPC 750" in this section).

Commotion

Developed by a visual effects supervisor at Industrial Light & Magic, this \$2495 video-painting program from Puffin Designs (415/331-4560, www.puffindesigns.com) targets professionals in film and video production. It combines Photoshop-style image-editing features with real-time playback of uncompressed video. Unique functions include a wire-removal tool and a Super Clone brush that replicates an image among multiple frames. (See "Commotion on the Desktop" in this section.)

Digital Radar

This \$30 software package from Connectix (415/571-5100, www.connectix.com) converts any Mac with a video camera into a sophisticated security device. Digital Radar monitors the area in front of your computer, automatically recording still images or video if an intruder enters the scene. The software can also issue an audible alarm or recorded voice message. A calibration feature lets you adjust the software's sensitivity to movement. The program can store password-protected video files on any device accessible to the computer, including remote network servers. Digital Radar works with the Connectix QuickCam or any other tethered video camera that supports QuickTime.

GoLive CyberStudio 2.0

Just a few months after introducing one of the strongest Web-page creation tools, GoLive (415/463-1580, www.golive.com) has introduced a significant upgrade to CyberStudio that fixes most of the problems in the original and adds a slew of new features. You can now work with and preview frames right in the program; work in multiple languages on the same page; and check spelling in entire sites. CyberStudio 2.0 also shows you broken links in a page and lets you fix them on the spot.

Eye Candy for After Effects

Alien Skin Software (919/832-4124, www.alienskin.com) has adapted its popular Adobe Photoshop filters for use with Adobe After

Effects. Each filter has been modified to take advantage of time-based media, letting you create flames that roar, motion trails that really move, and bevels that grow progressively deeper. At \$549, it carries a stiffer price tag than Eye Candy for Photoshop, but After Effects users will find much to enjoy here.

QX-Effects

The latest graphics software from Extensis (503/274-2020, www.extensis.com) is a \$130 QuarkXTension that incorporates many of the special effects in the company's PhotoTools plug-in package for Adobe Photoshop and makes them work in QuarkXPress. Now you can apply shadows, bevels, glows, and other filter effects to text and graphic elements in your QuarkXPress document. You can merge the effects with foreground and background objects to create smoother transitions. Owners of the company's QX-Tools 2.0 can purchase QX-Effects for \$50.

Olympus D-320L Digital Camera

The new D-320L from Olympus America (516/844-5000, www.olympus.com) is the successor to the company's well-received D-300L. Like its predecessor, it offers 1024-by-768-pixel resolution, but uses a smaller, lighter design and adds two new features: removable storage and a video-output port that lets you view images on a TV. At \$699, it's also \$200 cheaper than the D-300L. Olympus has also introduced the D220L, a \$499 camera that offers 640-by-480-pixel resolution. (See "More Cameras on Parade" in this section.)

Bryce 3D

The latest version of the 3-D graphics software from MetaCreations (805/566-6200, www.metacreations.com) adds animation capabilities and an expanded Materials and Textures palette. You can animate atmospheres, objects, terrains, and imported models. A new Hyper Textures feature lets you create atmospheres that can be penetrated by objects, cameras, or lights. The software is scheduled to ship this fall for \$299.



1996 It's the 10th revision and it's a rush.

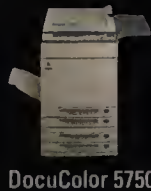
It's got to be perfect, but color output costs too much.

What you say about color printing can't be printed here.

1997 Introducing the Xerox DocuColor 5750. It adds new words to your vocabulary.



Now you can get color on-budget and on-time. Because the Xerox DocuColor 5750 Digital Color Copier/Printer offers high-quality continuous-tone color at an affordable price. In fact, you can get a connected unit for the cost of a stand-alone color copier/printer. At 6 ppm, it prints Pantone-licensed color and sharper black text. And no one offers more certified front



DocuColor 5750

ends (EFI Fiery, DocuPress, Splash). What's more, the DocuColor 5750 is only the newest in the Xerox family. The Xerox Regal 5790 is a proven workhorse. And the DocuColor 40 delivers consistent quality color at a breathtaking 40 ppm. All come with our Total Satisfaction Guarantee. Visit our Web site at www.xerox.com. Or give us a call at 1-800-ASK-XEROX, ext. 670.

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THE
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COMPANY
XEROX

Circle 100 on reader service card

Faster.



Better.

Smarter.

C600x/240 SPECIFICATIONS:

MODEL NAME	C600x/240
Processor Type	603e/240MHz
RAM	32MB
In-Line L2 Cache	1MB
CD-ROM Speed	12X
Hard Drive	3GB
Processor Bus Speed	80MHz
Video Memory	1MB
33.6 Fax/Modem	Included
External Speakers	Included
Jabra Microphone	Included
10 Base-T Ethernet	Yes

Monitor not included. Features subject to change without notice.

The SuperMac C600x with CacheDoubler technology boosts performance by up to 44%.*

The SuperMac C600x line from UMAX offers everything you're looking for in a superior machine: from sophisticated architecture and innovative technology to a very competitive price and the best performance in its class.

Plus, the C600x comes equipped with CacheDoubler, the new in-line L2 cache card exclusively from UMAX that "conquers the 603e hill," according to *Macworld* (August 1997). All this from UMAX, a company dedicated to the Mac OS system and rated #1 in both service and purchase satisfaction in a June 1997 *Macworld* poll. Get it all with the SuperMac C600x from UMAX.



For more information on where to purchase the C600x, call **1-888-625-UMAX** or visit us at <http://www.supermac.com>

UMAX[®]

Computer Corporation

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* Performance statistics based on comparison to C600 without CacheDoubler. The C-series CacheDoubler upgrade card for installed base will be available in September '97.

Circle 99 on reader service card

New Products

THE LATEST MACINTOSH RELEASES

Edited by Keith Mitchell

COMMUNICATIONS

Telephony Oasis

You don't have to be stranded with one phone line anymore. Big Island (415/237-0350, www.big-island.com) has upgraded its \$119 YoYo Telephone Manager to support up to six. Version 2.0 is less dependent on your Mac and can forward or transfer calls even when the computer is off. The redesigned interface has added features like user-defined line naming for multiline offices. It also supports subscriber services such as three-way calling. Current users can download the upgrade for free.

INPUT DEVICES

MicroPoint and Click

Bored with standard-issue input devices? There's a new alternative: the \$90 MicroPoint MicroPad controller from Altra (307/328-1342, www.altra.com). The MicroPoint is stationary like a trackball, but instead of moving a ball, you move a small



Altra MicroPoint

controlling piece within a rectangular area that maps to the display—much like using a stylus on a drawing tablet. Users can define macros, program buttons, and create “hot” corners of the screen to control which windows are active instead of using the pull-down application menu.

MULTIMEDIA

Authorware Gets Shocked

Authorware 4, the latest version of the \$2000 multimedia authoring package from Macromedia (415/252-2000, www.macromedia.com), lets you add Shockwave and Flash animations to your Authorware projects. You can also store large media elements as external linked files, use ActiveX controls in Authorware projects, and create hybrid Mac-and-PC titles from your Mac. The \$3000 Authorware 4 Interactive Studio includes Authorware 4, Director 6, xRes 3, and SoundEdit 16.

Presentation Flair

You've got a digital camera. Now what do you do with all those images? Slides and Sound Plus from InMedia Presentations (604/893-8955, www.inmediapresents.com) is a \$70 program that lets you create slide shows from images pulled directly from your digital camera. You can include full-motion video, text, voice-overs, and music; completed slide shows can be exported to a VCR or distributed on disk along with free playback software. The package also includes software for distributing your slide shows by e-mail.

Boris and After

Artel Software (617/451-9900, www.borissfx.com) has good news for users of Adobe After Effects. Its 3-D digital-video-effects package, Boris Effects, is now available as an After Effects plug-in. You can now perform such magic as running separate video clips on each side of a spinning cube. The \$495 program also lets you add light sources and edit multiple layers of video.

NETWORKING

One Card, Two Cards

If you need networking and modem capabilities in your PowerBook, Farallon Communications (510/814-5100, www.farallon.com) has a new PC Card for you. The 33.6 EtherMac LAN/Modem PC Card combines a 33.6-Kbps modem and 10-Mbps Ethernet in one \$349 PC Card. It allows simultaneous operation of modem and LAN connections.

ONLINE

Vivid Video

Don't get caught upstream without your video software. Vivo (617/899-8900, www.vivo.com) has released a new version of its \$695 streaming-video host package. VivoActive Producer 2.0 is now server-independent, letting you serve Vivo video streams from Microsoft, Netscape, and Progressive Networks servers. Web developers can process content from remote computers through scripts that post new streams and update video on the server. Intranet users with ISDN or LAN-speed connections can view clips four times the size of those viewable with the first version of VivoActive Producer.

Live in the Studio

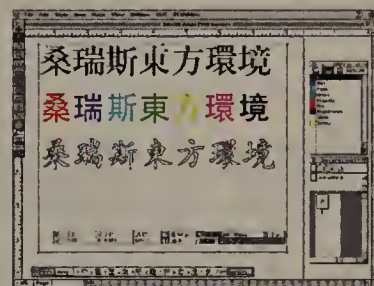
Web authoring options keep multiplying, and GoLive (415/463-1580, www.golive.com) is doing its part with an update to CyberStudio. The \$349 version 1.1 has an updated interface to display pages as if viewed through Netscape Navigator or Microsoft Internet Explorer. Web authors can create and access frequently used elements and styles with the new HTML templates. CyberStudio 1.1 also improves support for QuickTime, FTP, JavaScript, and QuickDraw 3D.

PUBLISHING

Multilingual Creations

Now you can publish in Korean, Japanese, and Chinese from the comfort of an English-language sys-

tem. Sunrise Asian Environment 2.0 from Sunrise Hitek Service (773/777-8708, www.sunrisehitek.com) is a \$99 QuarkXTension that lets you enter text and manage fonts in all three languages, including traditional and simplified Chinese. You can use multiple languages on the same page and align vertical text.



Sunrise Asian Environment 2.0

Font Hoarding

If you just can't get enough fonts, ITC (212/949-8072, www.esselte.com/itc/) has released a limited-edition CD-ROM containing the entire Fontek Display Library. Called ITC On Display, the \$2999 library includes more than 375 different display faces in PostScript Type 1 and TrueType formats.

STORAGE

Write and Rewrite

If you've had it with tape backup, it may be time for a rewriteable CD-RW system. Microboards' PlayWrite 2060 CD-R/CD-RW drive (612/470-1848, www.microboards.com) lets you record write-once CD-Rs at 2X speed and rerecord on rewriteable media at 6X up to 1000 times. It is available in a \$635 internal version and a \$685 external version.

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Reviews

Color Laser Printers

PRICES PLUMMET WITH THE
LATEST OFFERINGS
FROM TEKTRONIX, XEROX,
AND LEXMARK

COLOR INK-JET PRINTERS PRODUCE stunning, photo-quality output for under \$500, but they're not ideal for all uses. If you want high-quality color output combined with workgroup-level performance, you need to consider a color laser printer. The latest models—the Xerox DocuPrint C55mp, the Lexmark Optra SC 1275n, and the Tektronix Phaser 560—produce vibrant 600-dpi color output on plain paper and can crank out monochrome pages at 12 to 14 sheets per minute (color pages at 3 to 4).

Simplified Setup

Color laser printers have always been notoriously hard to set up; you have to deal with four separate toner cartridges, fuser oils, print drums, developer cartridges, and waste bottles to be snapped into place. Lexmark and Tektronix have tried to make setup as painless as possible: the Phaser 560 uses toner cartridges that slide easily into place, and the Optra SC's cartridges fit into a carousel-style assembly. You turn a dial to rotate the Optra's mechanism to the correct, color-coded slot, then drop in a cartridge.

The Phaser 560 power switch, paper tray, output tray, and manual paper feed-



er are all mounted on the sides of the printer; you have to clear at least four feet of desk space to accommodate it. To make matters worse, the paper tray is located directly underneath the output tray—you have to lift the output tray every time you want to load or check the paper tray.

The DocuPrint is far more compact than the other two printers, with a well-marked control panel and a convenient front-loading paper tray. Alas, setup and maintenance of the DocuPrint aren't nearly as simple: you have to dump toner powder into the printer's toner bin from plastic containers—an archaic design (and potentially messy) compared with the

snap-in cartridges many competitors use. Assembly is complicated (although a poster-size set of instructions helps), and unlatching the front door was troublesome. The manual-feed tray is unbelievably flimsy and inadequate for workgroup use.

Quality Runs the Gamut

Like its predecessor the Phaser 550, the Tektronix Phaser 560 produces beautiful, near-photographic output, with fine detail and colors that are deep and intense without being overly saturated. In both Standard and Premium printing modes, the 560's output was ranked the best by our output experts, above that of the

REAL PRODUCTS REAL RATINGS

Reviews you can trust: Unlike other publications, Macworld rates only final shipping products, not prototypes. What we review is what you can actually buy.
Outstanding ★★★★★ = 9.0–10.0 Very Good ★★★★ = 7.0–8.9 Good ★★★ = 5.0–6.9 Flawed ★★ = 3.0–4.9 Unacceptable ★ = 0–2.9

Lexmark and Xerox. (Oddly, the Phaser's Standard output garnered higher quality ratings than its Premium output, despite the fact that printing in the 1200-dpi mode more than doubled printing times.) The 560's Fast Color mode produces quick color output that looks almost as good as Standard printing in a fraction of the time.

The Xerox DocuPrint produces outstanding color output at 600 dpi, placing very close to the Tektronix in Macworld Lab quality tests. The DocuPrint handles light colors and subtle gradients exceptionally well, and the Xerox printing software offers a unique Save Toner option, which allows you to print in less-saturated color. The washed-out full-color image is more than adequate for rough proofs.

The Lexmark offered the worst print quality of the trio. Although the Optra provides decent rendering of light areas, it offers muddy detail in darker areas and unnatural skin tones.

Speed Surprises

When Macworld Lab tested color laser printers a year ago ("Color Laser Values," November 1996), the Tektronix Phaser 550 rated fastest overall, but its successor, the Phaser 560, turned out to be slower than both the new Xerox and Lexmark printers in many of our tests.

Bargains of a Different Color

Although all three of these printers are less expensive than last year's models, the advertised base prices can be deceiving. For example, the DocuPrint C55 base model sports a startlingly low \$3500 vendor's estimated price, but that doesn't include Adobe PostScript Level 2 or Ethernet support, both essential for workgroup performance. Tossing in those extras—which come standard on the



Colorful Differences In default mode, the Tektronix Phaser 560 (A) offers near-photographic output with fine detail and deep, intense colors. The Xerox DocuPrint (B) comes close, handling light colors and subtle gradients very well. The Lexmark Optra (C) produced muddy detail in darker areas and poor color fidelity.

C55mp version we tested—adds about \$1000 to the price. Likewise, the Phaser 560 lists for \$4495... for a stripped-down model with 8MB of RAM—not enough memory to handle most color-printing jobs. Upgrading the unit to 40MB of RAM—required for 1200-dpi printing—raises the price to \$5495, and adding Ethernet costs another \$595.

Macworld's Buying Advice

Yes, the Phaser 560 is bulky, boxy, and a little slow. For the best possible color laser output, the Phaser is the clear winner. Even when used in Standard mode, the Phaser produces output superior to that of its competitors. And although the 560 may be poky when printing large color files, it sped through our Microsoft Word and Excel tests, boosting its standing as a strong workgroup performer. Toner and other consumables are also easy to replace, and the printer comes with good documentation. The Xerox DocuPrint is almost as appealing—especially with its compact case design and lower price—but its clumsy toner-refill system and wimpy paper feeder put it in second place.—JOSEPH SCHORR

DocuPrint C55mp

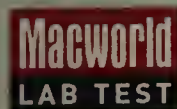
RATING: ★★★★★/7.1 **PROS:** Compact design; competitive price; crisp, vivid output. **CONS:** Awkward toner system; flimsy hardware. **COMPANY:** Xerox (716/423-3413, www.xerox.com). **COMPANY'S ESTIMATED PRICE:** \$3500.

Optra SC 1275n

RATING: ★★★★★/6.8 **PROS:** Fast; well-designed; easy-to-install toner and consumables. **CONS:** Muddy, oversaturated output lacks detail; unnatural skin tones. **COMPANY:** Lexmark (606/232-2000, www.lexmark.com). **LIST PRICE:** \$4999.

Phaser 560

RATING: ★★★★★/7.6 **PROS:** Rich color; sharp focus; minimal dithering. **CONS:** Bulky, awkward case design. **COMPANY:** Tektronix (503/682-7377, www.tek.com). **LIST PRICE:** \$5495.



New Breed of Color Lasers: Still Slow

■ Best result in test. Shorter bars are better. Times are in seconds.

Print Mode	RAM	Short Multi-font Memo	Long Single-Font Report	Spreadsheet	Illustration	Bitmapped Photograph	Newsletter	Web Browser
Lexmark Optra SC 1275n - default	32MB	66	129	68	185	141	70	75
Lexmark Optra SC 1275n - best	32MB	67	130	68	238	154	94	83
Tektronix Phaser 560 - default	40MB	69	109	61	404	278	158	82
Tektronix Phaser 560 - best	40MB	181	404	122	820	511	318	205
Xerox DocuPrint C55 mp - default	40MB	76	125	79	354	405	130	122
Xerox DocuPrint C55 mp - best	40MB	79	125	94	440	421	184	188

Behind Our Tests For detailed information on our methodology, see www.macworld.com/tests/.—Macworld Lab testing supervised by Paul Brown

Midrange Digital Cameras

KODAK DC120 LEADS IN IMAGE QUALITY AND CONTROL BUT LACKS RELIABILITY

GENERALLY SPEAKING, I LOVE digital cameras. There's nothing like the satisfaction of shooting a bunch of pictures and poring over them that very same afternoon. But on a recent cruise through Alaska armed with three digital cameras—Kodak's DC120 Zoom, Minolta's Dimage V, and Sharp's VE-LC1—I had a rude awakening that demonstrated just how brittle the technology can be.

After I put a set of used batteries into the Kodak DC120, the camera stopped functioning and produced a strange error message. Replacing the batteries didn't help. So I leapt off the boat in Juneau to call a Kodak representative and discovered that I had corrupted the camera's built-in firmware. The solution was to download replacement firmware (or perhaps that should be *infirm*-ware). The next day in Ketchikan, I tracked down a phone line and downloaded and installed the fresh firmware, just in time to race around the city and shoot a few totem poles. Unfortunately, when I blew the firmware I also wrecked the Kodak's

autoexposure mechanism; my totems looked like grim specters in a snowstorm.

The tragedy is that—prior to its problems—the DC120 *had* performed beautifully, delivering high-resolution images with accurate color. Its demise still left me with two functioning digital cameras, but neither the Sharp nor the Minolta came close to the Kodak in image quality; the Minolta suffered from a defective shutter release. The moral is that, like computers, digital cameras are skittish creatures that can go haywire without warning.

A Great Divide in Picture Quality

Although the three cameras are comparable in terms of price—which ranges from \$799 to \$999—they differ in nearly every other respect. With very few exceptions, the differences weigh heavily in favor of the Kodak DC120. First and foremost, the DC120 contains an 836,400-pixel CCD array (850 by 984 pixels), compared with the more common 350,000-pixel CCDs found in the Minolta and Sharp cameras. The DC120 interpolates its images horizontally to

a whopping 1280 by 960 pixels; the Minolta and Sharp crop down to the standard 640 by 480 pixels—which means the DC120 delivers pictures four times as large as its competition's (see "Freeze Frames").

Even so—although residents of the last frontier state may disagree—bigger is not always better; color and clarity are just as important as sheer number of pixels. Kodak's DC120 proved to be the best overall performer in these departments as well. For its part, the Sharp VE-LC1 generated lackluster images with gummy details and drab colors. It also did a poor job of retaining subtleties, producing empty skies and flat gray terrain. The Minolta Dimage V captured sharper detail and more plausible depth, but the colors were undersaturated, with a distinct yellow-green cast.

Zooms, LCDs, and Storage

The DC120 and Dimage V each offer a 3× zoom, joining the Kodak DC50 and Ricoh RDC-2 as the only digital zoom cameras priced under \$1000. But while the DC120 offers an intuitive motorized zoom, Minolta's Dimage V relies on a plastic lever that slides down to a Macro notch for shooting close-ups. Unfortunately this design makes it much too easy to set the lever to Macro mistakenly and shoot blurry pictures.

Picture This: Midrange Digital Cameras Don't Measure Up

	Kodak DC120 Zoom	Minolta Dimage V	Sharp VE-LC1
Star Rating	★★/4.4	★★/4.9	★★★/6.2
List price	\$999	\$895	\$799
Phone number	716/724-4000	201/825-4000	201/529-8200
Web address	www.kodak.com	www.minoltausa.com	www.sharp-usa.com
Dimensions (w × h × d, in inches)	4.3 × 2.2 × 5.7	5.2 × 1.5 × 2.8	4.9 × 3.2 × 1.6
Maximum image size (in pixels)	1280 × 960	640 × 480	640 × 480
On-board memory	2MB	none ^a	4MB
Expandable storage	2MB and 10MB cards	2MB and 4MB cards	no
Maximum storage capacity (in images) ^b	20	16 ^c	30
Closest focal distance (in inches)	7.9	2.0	3.1
Built-in flash	yes	yes	no
LCD preview and playback	yes	yes	yes
Optical viewfinder	yes	no	no
Date stamp	yes	yes	yes
Photoshop acquire module	yes	yes	yes
Rechargeable battery	no	no	no
Carry case	no	yes	yes

^a 2MB card included. ^b Images at highest resolution. ^c May be lower in actual use.

All three cameras include color LCD screens for previewing and deleting captured images. The Minolta and Sharp models rely on the LCD for framing and lack an optical viewfinder. Of the two, the oversize Sharp LCD measures nearly an inch larger diagonally and provides a smoother display. It also lists the number of images you have available, where the grainy Dimage V LCD lists only the number you've taken—an especially misleading constraint since the Dimage's memory fills up differently from one session to the next, depending on how well the images compress. Minolta claims the Dimage V holds 16 full-resolution images, but in my experience it rarely worked out to more than 14.

The DC120 offers both LCD preview and an optical viewfinder, but like other Kodak cameras the DC120 makes it very difficult to frame a shot with the LCD. You have to press two buttons simultaneously and then half-press the shutter release. I gave up after the first two pictures.

Without expansion, the Sharp VE-LC1 holds the most full-size images—up to 30—and the Dimage V holds the fewest. The VE-LC1 also includes the most built-in memory (4MB), but it does not permit you to expand via cards. In the tradition of Apple's QuickTake 200, Minolta's Dimage V forsakes on-board memory and relies entirely on a bundled 2MB SmartMedia card (4MB card available). The DC120 is the most expandable, permitting you to add a 2MB or 10MB mini-PC Card to the 2MB of internal RAM. Best of all, you can select among four compression settings with the DC120. In the DC120's standard configuration you can take as many as 20 compressed images or as few as 2 uncompressed, so you have the freedom to decide whether quantity or quality matters most.

The Dimage and VE-LC1 earn prizes for gratuitous extras. The former includes a detachable lens that tethers to the main camera body by a 3-foot cable, recommended for shooting over crowds and around corners. The Sharp takes after the Sony DSC-F1 by including an infrared transmitter for downloading images to your computer. That's pretty cool, but I'd sooner buy a less expensive camera and suffer with a boring but reliable serial cable. Meanwhile, none of these cameras includes the best extra: a rechargeable battery. All three rely on



Freeze Frames These shots of Glacier National Park illustrate the vast differences in image quality between the Kodak DC120 and its competitors. All three pictures appear at the same resolution; the DC120 image (A) contains four times as many pixels. The DC120 accurately captured the snow-cone blue glacier, while the Minolta Dimage V (B) and Sharp VE-LC1 (C) images tend toward pale green. The VE-LC1 also blotted out most of the detail in the sky. Like the DC120, the Dimage V let me zoom in on the subject; I had to get on top of the glacier to capture a similar shot with the VE-LC1.

AA cells, and the Sharp and Minolta burn up a set of four in virtually every session.

Macworld's Buying Advice

According to Kodak, the DC120 should run fine as long as you replace the batteries when instructed and always install fresh cells. But if you aren't prepared to be that diligent, watch out: Kodak has acknowledged that, due to the DC120's LCD design, the firmware and autoexposure may become corrupt when batteries are low. An upcoming revision to the firmware repair utility will restore a blown autoexposure to rough working order, but the only factory-fresh solution is complete recalibration at Kodak's lab. Were it not for this lapse in stability—we've seen no other camera do this—we would have awarded the DC120 four stars. It has better picture quality than the \$899 Olympus D-300L and a substantial-

ly lower price than the \$3695 Polaroid PDC-2000/40, so it's a crying shame that the camera is ultimately unreliable. Without a fix to the core corruption problem, we can't recommend the DC120.

The Sharp VE-LC1 is compact, handsome, and easy to use—a nice introductory model for novices—but for the price I expect a flash, a zoom lens, and better image quality. The Minolta Dimage V is my least favorite of the three because of its odd design, grainy LCD, and the fact that it downloads its images in a proprietary EXIF format. (To convert the images to JPEG, you have to laboriously open and save them one at a time.) If you're looking for a point-and-shoot model that captures 640 by 480 pixels, I'd bypass the Sharp and Minolta models and look at the less expensive and more straightforward QuickTake 200.—DEKE MCCLELLAND

SuperMac C600x

UMAX CACHES IN WITH NEW IN-LINE DESIGN

UMAX COMPUTER'S SUPERMAC C600x is the first of a slew of new machines to boost performance through an in-line cache, a design change that helps alleviate performance bottlenecks by doubling the speed of CPU-to-cache communications. (For more detail on in-line cache, see "Upstart Macs" in this issue.)

Umax's in-line cache card, called CacheDoubler, creates an 80MHz connection between its 1MB cache and the



Umax SuperMac C600x/240

CPU, which ordinarily communicate at the system-bus speed (in this case, 40MHz). CacheDoubler plugs into a Zero Insertion Force (ZIF) socket on the motherboard, and the CPU (either a 240MHz or 280MHz 603e) plugs into CacheDoubler. Umax borrowed the ZIF-socket idea from the Pentium world, but as the first Macintosh maker to incorporate it, Umax gets extra points for both innovation and upgradability.

As a result of the in-line cache, the C600x/240 is 26 percent faster overall than the C600/240, and the C600x/280 rivals machines whose CPUs have higher megahertz ratings. In Macworld Lab tests, the C600x/280 ties the Apple Power Macintosh 6500/300 and comes in just 4 percent under the Motorola StarMax 5000/300 MT in overall scores.

With such superlative numbers, the C600x/280 definitively climbs to the top rung of 603e performance. Alas, the C600x's feature set and price fall short. The StarMax 5000/300 remains our Editors' Choice for best SOHO system, along with the value-oriented Power Computing PowerBase 240 (see *Mac Superguide* in this issue).

Specifically, the SuperMac C600x's skimpy expandability features hold it back. Umax *has* improved on the configuration of the older C600's slightly, offering a 4GB drive in both C600x models (as opposed to the C600's 2GB drive), and a 12×—rather than an 8×—CD-ROM drive. But although it sports an ample four free drive bays, the C600x offers a mere two PCI slots, and in the C600x/280 one of these is filled with a 2MB Matrox video card. True, both models include an internal 33.6-Kbps Global Village modem and 10BaseT Ethernet, so you won't have to use PCI slots for those, but if you're looking for a system whose expandability will carry you into the future, the C600x's slim number of free PCI slots probably won't suffice.

Umax also includes on-board video to allow the use of two separate monitors. People who need to use dual monitors will want to display more than the 256 colors visible with the C600x's 1MB of on-board VRAM. And if you're doing any type of publishing or image-related work, the C600x's standard VRAM (1MB to 2MB, depending on the model) won't cut it, either—you'll have to spend another \$250 to upgrade to a 4MB video card. By comparison, for \$100 more the StarMax 5000/300 includes 4MB of VRAM, an Iomega Zip drive, four free PCI slots, a 16× CD-ROM drive, and faster performance—a better investment all around.

Macworld's Buying Advice

The SuperMac C600x's in-line caching scheme advances this line into the top class of 603e performers, and its upgradable 603e CPU is a nice touch. If speed is important to you, this system is definitely worth considering. If you're looking for a top-performing, feature-rich 603e machine, the StarMax 5000/300 offers a wealth of features, 4 percent better performance, and a lower price.—TOVA FLIEGEL

SuperMac C600x

SUPERMAC C600x/240 ★★★/6.0

SUPERMAC C600x/280 ★★★/6.2

PROS: Top-level 603e performance; upgradable CPU and cache. **CONS:** Skimpy VRAM; meager PCI slots for the price. **COMPANY:** Umax Computer (510/226-6886, www.supermac.com). **LIST PRICE:** C600x/240 as tested \$2349; C600x/290 as tested \$2799.

Macworld
LAB TEST

In-line Cache Speeds Up 603e-Based SuperMacs

■ Best overall performance. Longer bars are better. Bold indicates best result in a specific test. ▶ New system. An Apple Power Macintosh 7100/80 has a SpeedMark score of 1.0.

	SpeedMark	CPU	FPU	Disk	Video	Star Rating
Motorola StarMax 5000/300 MT	2.7	2.8	2.5	2.1	4.0	★★★/6.7
Apple Power Macintosh 7300/200 (604e)	2.6	2.9	2.9	1.6	3.6	★★★/5.9
▶ Umax SuperMac C600x/280	2.5	2.7	2.6	2.0	3.5	★★★/6.2
Apple Power Macintosh 6500/300	2.5	2.7	2.5	1.9	3.3	★★★/5.9
▶ Umax SuperMac C600x/240	2.4	2.5	2.5	2.0	2.4	★★★/6.0
Power Computing PowerBase 240	1.9	2.1	1.9	1.6	2.4	★★★/6.2
Umax SuperMac C600/240	1.9	2.0	2.0	1.7	2.1	★★★/5.0

Behind Our Tests

For details on our benchmarks, see *Mac Superguide*, September 1997, or www.macworld.com/tests/.—Macworld Lab testing supervised by Mark Hurlow



burning reasons to own

Fractal Design

NEW

Painter 5

New Fractal Design Painter® 5 is the ultimate way to create sizzling original artwork—combining comprehensive image-editing features with Fractal Design's patented Natural-Media® technologies.



Expandable plug-in brushes

let you paint with fire and neon, retouch in a snap, and transform images into hand-rendered paintings you can scale, twist, skew, and mirror—the possibilities are endless. And an extensible architecture means that as more brushes become available, you can add them to your existing software.



Dynamic plug-in floaters

perform special effects like burning and tearing edges, Liquid Metal, Glass Distortion, Bevel World, Impasto and more—all available only in Painter. You get the flexibility of a Photoshop-style Adjustment Layer, with virtually unbounded imaging functions.



Powerful Internet publishing tools

help you create red-hot Web sites using seamless background patterns, instant 3-D buttons, and multi-frame GIF animation.



Industry-standard masking

means you don't have to burn up time learning how to do it. And Painter 5 reads and writes files in Photoshop's native format, so moving between programs is easy.



Terrific tear-off tools.

Spark your creativity by working the way you want to—just tear off brushes, art materials, and menu items and place them on custom palettes that fit your needs precisely.

With scorching features like these, why waste another minute. Get the world's most creative design tool now.

Painter 5. It's hot. It's cool.

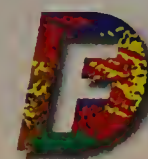
For sales and product information, call

888-871-7387

Visit our Web Site at <http://www.fractal.com>

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1.800.255.6227

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**FRACTAL
DESIGN
CORPORATION**

Circle 5 on reader service card

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Retrospect 4.0

CROSS-PLATFORM UTILITY CUTS BACKUP TIME IN HALF

BACKING UP A NETWORK TENDS to be a painful process—not only during the backup itself, but when you try to pinpoint the bottlenecks as well. Dantz Development has managed to solve both problems in the latest version of Retrospect. With its IP support for both Macintosh and Windows—and the resulting faster backups—and an enhanced interface that includes a performance indicator, Retrospect 4.0 is an indispensable tool.

Filling a void in the Mac-only version 3.0 (see *Reviews*, April 1996), Dantz last year released a remote pack for Windows clients. But many Mac managers complained about the significantly faster backup time for Windows: Retrospect used a speedier, more efficient network protocol—TCP/IP—to move data from Windows clients to the backup drive, while the only option for Macs was poky old AppleTalk. The new version levels the playing field by providing full TCP/IP support for PowerPC-equipped Macs running Open Transport 1.1.2. (Some might consider the lack of IP support for 680X0 Macs a negative; I view it as omitting a minor feature in the interest of bringing Retrospect to market on time and coincident with the release of Mac OS 8.)

Macworld Lab tested Retrospect's Macintosh (TCP/IP and AppleTalk) and Windows 95/NT (TCP/IP only) clients and discovered significant performance increases over the last version (see "Retrospect 4.0: Speedy Client Adds TCP/IP Capability"). Even greater speed improvements are possible using

a faster backup medium, such as an Iomega Jaz drive, rather than a tape drive.

One of the many reasons Retrospect has become a familiar sight in Mac managers' toolboxes is ease of setup and use. Version 4.0 is no different; installing the application and client software requires no more brain power than switching floppies, and the outstanding interface guides new users through the process. And Dantz has made Retrospect easier to use than ever, explaining complex processes and getting rid of the vague terminology that plagued previous versions.

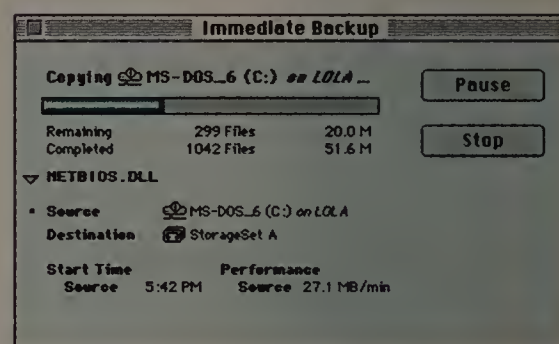
Dantz has also added a few niceties that complement rather than complicate Retrospect's interface. The most useful addition is a performance indicator that appears in the backup progress dialog box. Blinking lights indicate the status of both the backup source and the target media device (tape drive, removable disk, or CD-R drive), allowing administrators to see at a glance whether they could improve backup performance by moving to a speedier device.

Another improvement is that each type of client is represented by a different icon, so you can shuffle devices visually based on their backup speed. For example, you can move the icons for the slower AppleTalk-connected Macs to the bottom of the list so that those machines are backed up last. (Devious administrators could also sort by preferred operating environment—say, allowing Macs to back up ahead of PC clients.) You can configure Retrospect to generate an e-mail alert when backup errors occur

or a tape needs to be changed. You can even configure client computers en masse from the Retrospect application.

Macworld's Buying Advice

If you don't think backup is an important part of your daily network routine, consider how much it costs to retrieve data from a crashed hard disk. Express service from DriveSavers to recover a



Twinklin' Tape Drives Retrospect 4.0's new flashing dots (like the one shown next to Source) indicate which part of your backup needs a speed boost. Solid dots indicate data moving to or from the backup source or target, letting administrators know if moving to a faster tape drive (or other archival drive) will improve overall backup performance.

3GB volume starts at about \$2000, and there's no guarantee your data will be recovered. Retrospect gives you that guarantee in a form that's easy to use and administer. Peace of mind has never been so cheap.—MATT CLARK

RATING: ★★★★★/9.3 **PROS:** Outstanding performance over TCP/IP; e-mail notification of backup errors; more options for centralized administration of remote clients. **CONS:** None significant. **COMPANY:** Dantz Development (510/253-3000, www.dantz.com). **LIST PRICE:** \$249; ten-client pack \$299; Network Backup Kit (Retrospect plus ten clients) \$499.



Retrospect 4.0: Speedy Client Adds TCP/IP Capability

Longer bars are better. Times are in megabytes per minute for backup and verification. ▶New product.

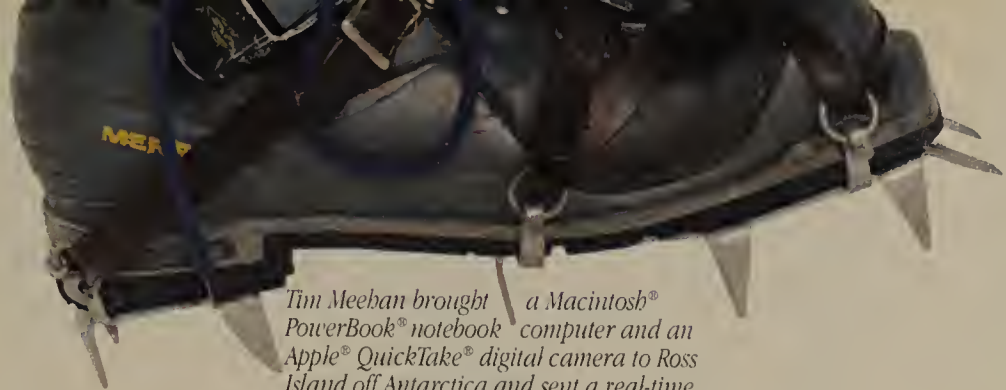
	Direct to Tape	Windows via TCP/IP	Mac via TCP/IP	Mac via AppleTalk
▶ Retrospect 4.0	14.7	12.7	11.4	6.1
Retrospect 3.0	13.5	10.5	NA	4.7

NA = Not available in this version.

Behind Our Tests

Macworld Lab installed Retrospect on a Power Macintosh 7300/200 equipped with 48MB of RAM. Backup clients included a Power Macintosh 7300/200 with 48MB of RAM running System 7.6.1 and a Windows 95 client on a Micron Technology Pentium 90 system equipped with 32MB of

RAM. Clients were backed up to a fast DLT tape drive. Tests measure the megabyte-per-minute rate achieved when backing up and verifying 100MB of files of various sizes and types (backup-only rates are approximately twice as fast).—Macworld Lab testing supervised by Matt Clark.



Tim Meehan brought a Macintosh® PowerBook® notebook computer and an Apple® QuickTake® digital camera to Ross Island off Antarctica and sent a real-time multimedia journal back to U.S. classrooms. Proving, once again, Macintosh is the coolest computer out there.

Ask Harry Mc
Broadcast De
television gra
corresponde

When we reflect on all that



No one has pushed the boundaries of technical innovation in music farther than Peter Gabriel, nor with more soul-stirring results. Gabriel, and his design teams at Real World and Starwave, created his latest CD-ROM, EVE, on Macintosh. The result, with its mix of music, speech, contemporary art, and game play, represents a milestone in interactive entertainment. (For information about EVE, go to <http://realworld.on.net/eve>. EVE is distributed in North America by Valley Entertainment. Call 1-800-357-5376.)

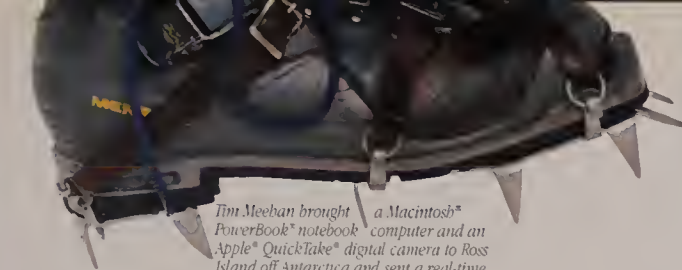
Dr. Donald Laub founded Interplast to help children and adults from Third World nations find high-quality, free reconstructive surgery to repair birth defects, burns, and other crippling deformities. Right now, they are using PowerBook notebook computers to provide 'telemedicine' links between physicians in the rainforest of Brazil and Yale University. So they can quickly share patient histories and information.

From the tiniest Proteobacteria to the brainiest Craniata, The Tree of Life represents an ambitious effort to catalog the world's organisms. Biologists David and Wayne Maddison began in 1985 by developing MacClade, a program for creating evolutionary trees, on a Mac® 512. Now they're using Macintosh computers to give the Tree a life of its own on the Web, where it's available to researchers, teachers, and students around the world.



Doug Green did more than design a revolutionary line of interlocking assemble-it-yourself furniture on Macintosh, he built an entire global company—from design to sales to payroll. "I'm not a computer geek," he admits, "and I wanted a system that was intuitive and accepting of creativity."





Tim Meehan brought a Macintosh® PowerBook® notebook computer and an Apple® QuickTake® digital camera to Ross Island off Antarctica and sent a real-time multimedia journal back to U.S. classrooms. Proming, once again, Macintosh is the coolest computer out there.



Ask Harry Marks, first recipient of the Lifetime Achievement Award from the Broadcast Designers Association, how he continues to redefine the look of television graphics and he'll tell you, "I use the Mac for art, stills, video, design, correspondence, communications—everything." Details at 11.



Rolling Stone magazine identified David Mash as "the industry's leading evangelist for the marriage of music and technology." In addition to working on new product development with companies such as software publisher Adobe™ Systems, and music synthesizer maker Korg, Mash developed the nation's first 4-year major in desktop music production at Berklee College of Music in Boston.



How do you change the corporate identity of a worldwide corporation operating in more than 200 countries, with a fleet of over 500 aircraft and more than 40,000 vehicles—and make it appear to happen overnight? As with all their work, Landor Associates used Macintosh computers. Beginning with rough drawings, through completed designs for new FedEx logos, print and packaging standards, signage, as well as vehicle and aircraft graphics.



When we reflect on all that people have done with Macintosh, we just have to wonder: What will you think of next?



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Last August, a University of Arizona/Tucson Ph.D. student attached a transmitter to a captive-raised, endangered loggerhead sea turtle named Adelita and launched her into the Pacific Ocean off Baja California for the long swim back to her nesting beach in Japan. They tracked her every move with a Power Macintosh® and shared the data with the world through a Web site.

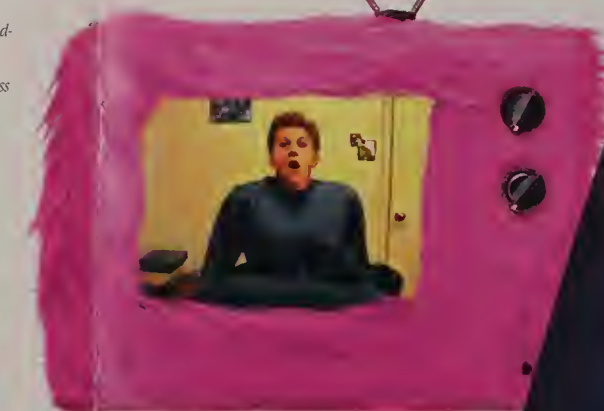
Moran's Marketing & Representations, Inc. helps beat-seeking Canadian tourists reach the sunny, tropical beaches of Mexico. With his trusty Macintosh computers, Luis Moran is able to track more than 6,000 travel agencies he relies on for information.

When your whole job depends on your ability to be outrageous, your tools need to be fluid, flexible and fun to use. Joe Boxer uses Macintosh to create, manipulate, and produce far out and funky designs for everything from boxer shorts to swimwear to T-shirts and children's clothing with a goofy, offbeat sensibility.



Look beyond the leading edge of magazine design, and you'll find Wired.® From its very first issue—produced on Mac computers staffers brought from home—Wired has used Macintosh to create award-winning work. By doing their own scans and manipulating them in-house, the Wired designers are able to produce its signature multi-layered look on deadline. Each issue is created electronically, proofed digitally, and FTP'd across the country to be printed using Mac computers—without expensive film or shipping charges.

It's not surprising that Macintosh makes multimedia easier for everyone—but even we didn't realize how easy it had become until 15-year-old student, Mark Thornton, sent us his prize-winning video "commercial" for Macintosh.



It wasn't enough for this Mac enthusiast to earn a degree in chemical engineering and an M.D., join the Peace Corps in Africa or practice medicine in Los Angeles. Dr. Mae Jemison became a science mission specialist on the space shuttle Endeavor. When she landed, she dedicated herself to finding ways to apply technology to social issues. Her projects range from applying satellite telecommunications technology to health care in developing countries to establishing an international science camp. Now that's multitasking!



To learn more about how Macintosh technology is inspiring people like Dr. Mae Jemison, David Mash, Dr. Donald Laub, and Harry Marks to do more, create more, and change the world, visit the AppleMasters Web site at www.applemasters.apple.com/

Dr. Donald Laub founded Interplast to help children and adults from Third World nations find high-quality, free reconstructive surgery to repair birth defects, burns, and other crippling deformities. Right now, they are using PowerBook notebook computers to provide "telemedicine" links between physicians in the rainforest of Brazil and Yale University. So they can quickly share patient histories and information.

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Doug Green did more than design a revolutionary line of interlocking assemble-it-yourself furniture on Macintosh; he built an entire global company—from design to sales to payroll. "I'm not a computer geek," he admits, "and I wanted a system that was intuitive and accepting of creativity."

It takes a special breed to fight evil, and a special kind of computer to manage the multi-million dollar exploits of Batman and the gang in a spectacular, yet timely manner. Director Joel Schumacher employed Apple solutions at nearly every level of the production, from script to screen to web to print. "The big difference was Macintosh," says the film's producer, Peter Macgregor-Scott. "I was amazed at how easily our staff adopted them."

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Communicator 4.0

INTERNET CLIENT PACKS MORE FEATURES INTO LESS RAM

FOR POINT-AND-CLICK APPLICATIONS, Web browsers have a surprisingly complicated set of features and capabilities. Netscape Communications has achieved a new level of complexity by adding e-mail, HTML authoring, and other functions to its sophisticated Web browser, changing the name from Navigator to Communicator in an effort to position the product as more than just a browser. The result is a well-integrated, one-stop Internet package that uses less RAM and is more stable than its predecessor. (Note: IDG, *Macworld's* parent company, owns a stake in Netscape Communications.)

Personality Change

Communicator is available in two versions. Both the Standard and Professional editions contain Messenger, an e-mail client; Collabra, a fancy spin on a newsgroup reader; Composer, an anemic HTML authoring tool; Conference, the Internet phone software formerly known as CoolTalk; and, of course, Navigator. (Netcaster, the new push technology that lets you subscribe to self-updating information sources, didn't make it into the Mac version.) The Professional Edition includes three additional features targeting the groupware market: a Web-based group calendar, an applet for linking to mainframes, and tools that allow network administrators to update and manage an installed base of clients from one location.

In spite of all the new components, Communicator is nearly free of the problems that plagued Navigator 3.0—namely, a huge memory appetite and a fondness for crashing unexpectedly (see *Reviews*, November 1996). Communicator 4.01 is refreshingly stable, and it uses 3MB less RAM than its predecessor (though the new components mean it still uses 2MB more RAM than Microsoft's Internet Explorer 3.0). The program also loads significantly faster; that's because Communicator initializes its Java support (PowerPC only) on the fly as it encounters Java applications, rather than each time it's launched, and because Symantec's just-in-time compiler has replaced the less-than-efficient Sun Microsystems

version. A new User Profile Manager relates your bookmarks, e-mail, and preferences to your identity so users sharing a machine can maintain different configurations. Netscape has also overhauled and simplified the program's menu structure. Switching between components via the Communicator task bar is elegant and straightforward, and the previously unwieldy preference options have been reorganized and placed in the Edit menu; all the settings but those for security are now in a single dialog box. The help function is still abysmal, however.

HTML, Dynamic and Embedded

This version of Navigator not only catches up with Internet Explorer 3.01 by adding support for Cascading Style Sheets, but surpasses it with support for



Dynamic HTML Communicator 4.0's sophisticated layout options, such as pixel-precise positioning and Cascading Style Sheets, let Web designers go crazy.

dynamic HTML (which lets you layer multiple pages on one screen and control absolute positioning of individual page elements). A toggle button makes it easy to hide tool bars, and clicking on and holding the Back button pops up a menu of recently visited pages. Missing from the Mac version, unfortunately, is the ability to bookmark the current location directly into nested bookmark folders. And while Communicator doesn't have Navigator 3.0's tendency to crash if you click in the browser window while printing, it does force you to wait while it pauses in the middle of the printing process.

Though it lacks stand-alone e-mail programs' power-user features—such as mail filtering and auto responses—Messenger offers basic e-mail capabilities. It supports the POP3 and IMAP protocols,

lets you use the User Profile Manager to access more than one account, and can encrypt messages for privacy. Most important, it supports HTML-based e-mail: you can create messages with simple formatting and embed almost anything found on a Web page. Internet Explorer's mail client offers similar features, but it doesn't support embedded Java or let you embed image files in messages.

Collaborate, Conference, Compose

Collabra, the newsgroup client, has an interface and feature set similar to Messenger's. It supports encrypted postings and those formatted with HTML, and it's easy to use. Conference, the conferencing client, launches a separate app that performs as well as most Internet phone products.

Composer, the Web-authoring component, makes it easy to create simple HTML pages and allows one-button publishing to a remote site. However, I'd recommend using a stand-alone tool if you're creating more than a few pages or want to use the latest tags: Composer doesn't support Netscape inventions such as frames or the new dynamic HTML features that its own browser window can interpret. You can no longer access the Reload button via a keyboard command, and you can't drag an image onto the browser to display its dimensions.

Macworld's Buying Advice

Navigator fans will welcome the improved browser, but Communicator 4.0 is probably worth paying for only if you'll use the other components. Casual Web surfers should take a look at Internet Explorer; while it lacks a few of Communicator's features, it's free and uses less RAM. The browser race will really heat up when Internet Explorer 4.0 is released in late summer 1997. Check back with *Macworld* then for the latest verdict.—PAUL DEVINE

RATING: ★★ ★/6.8 **PROS:** Uses less RAM and launches faster than Navigator 3.0; handles dynamic HTML; supports HTML-formatted e-mail; preferences settings for multiple users. **CONS:** Still uses more RAM than Internet Explorer; weak HTML authoring; lacks features found in Windows version. **COMPANY:** Netscape Communications (415/937-3777, home.netscape.com). **LIST PRICE:** Standard Edition \$59; Professional Edition \$79.

SuperScript 1260N

IT'S NOT POSTSCRIPT, BUT WHO CARES?

NOBODY WOULD BLAME ME FOR being pessimistic about the state of the personal laser printer market (see "The Best Personal Printers," June 1997). But then along comes a modestly priced, 12-pages-per-minute laser printer from NEC Technologies, and suddenly anything looks possible. After a year's absence, NEC reenters the Macintosh market with the SuperScript 1260N, a personal laser printer that relies on Adobe Systems' PrintGear, a low-cost page-description language.

From the front the SuperScript 1260N looks like any other laser printer: its platinum-gray box sports a front-panel display and an on/off switch atop a smallish 250-sheet paper tray (an optional 500-sheet tray costs \$199). Turn the printer around and you may be startled. The 1260N comes equipped with both parallel and Ethernet ports, but no serial port.

The 1260N's firmware, however, is different from any other Mac printer's: there's no PostScript or QuickDraw. Instead, there's PrintGear, PostScript's less brawny younger brother. Despite lacking PostScript capabilities, the 1260N's default 600-dpi setting produced crisp text output, and it printed Adobe Illustrator and Photoshop test documents with quality on a par with its PostScript-equipped competitors'.

The best thing about this printer's design, though, is its speed (see "Speediest Overall 12ppm Printer for Business Tasks"). Even in 600-dpi mode, this baby's

fast. And when we decreased the resolution to 300 dpi, print times shot to the top of the chart—the SuperScript printed *faster* than the speediest printer in our June roundup, an Apple LaserWriter 12/640 PS. (The increased speed you get from dropping to 300 dpi, though, is offset by degraded print quality.)

Because the 1260N isn't a PostScript printer, you can't use it with Apple's LaserWriter 8.4 or any PostScript driver.



SUZANNE ROADY

In previous Macworld Lab tests, we've observed that using LaserWriter 8.4 typically allows printers to image their pages up to three times faster than with their default drivers. Luckily, the 1260N is already plenty fast on its own. Plus, the PrintGear driver sports a number of special printing options; most are standard PostScript fare, but some—including watermarking—will be a welcome addition to the laser printing arsenal.

The 1260N's biggest letdown, though,

isn't the driver's fault, but the vendor's. If you connect the 1260N to a PC, you enjoy the benefits of owning a Web-ready printer—you can access the printer's controls via any standard Web browser, whether the printer is down the hall or across the country. Connect the 1260N to a Macintosh, though, and this feature isn't available—NEC didn't bother to include software to configure the printer's IP address from a Mac. In a cross-platform office (where a PC-based administrator could perform the IP setup tasks), this fault isn't as glaring as it is for single-platform Mac environments or home users.

The 1260N comes equipped with 2MB in its standard configuration, upgradable to 16MB maximum. NEC claims that by using Adobe's Memory Booster technology, the SuperScript can image jobs in 2MB that would require nearly 6MB in a nonboosted printer.

Macworld's Buying Advice

There's a lot to like in a laser printer that delivers fast print speed and fine output with a price half that of its rivals. Some users will be put off by the lack of a serial port, but most will enjoy the easy speed of an Ethernet connection. My only complaint is that by neglecting to include IP addressing software, NEC doesn't give Macintosh buyers the same features as their PC-based peers.—SUZANNE COURTEAU

RATING: ★★ ★/6.8 **PROS:** Fast print speeds; least expensive printer in its class. **CONS:** No serial port; users can't configure printer's IP address from a Mac. **COMPANY:** NEC Technologies (508/742-8000, www.nec.com). **COMPANY'S ESTIMATED PRICE:** \$1079.

Macworld
LAB TEST

Speediest Overall 12ppm Printer for Business Tasks

■ Best result in test. Shorter bars are better. Times are in seconds. ▶ New product.

	Short Multi-font Memo	Long Single-Font Report	Spreadsheet	Illustration	Bitmapped Photograph	Newsletter	Web Browser
Apple LaserWriter 12/640 PS	33	75	61	74	107	35	41
Hewlett-Packard LaserJet 6MP	37	92	77	120	347	48	60
▶ NEC SuperScript 1260N	27	67	55	118	140	32	42

Behind Our Tests

For detailed information on our methodology, see www.macworld.com/tests/.—Macworld Lab testing supervised by Lauren Black



"With Retrospect 4, Dantz takes its product to new heights. We know of no other backup and restore application on any platform as speedy, functional and easy to use."

MacWEEK, July 16, 1997

"Those considering a backup solution should definitely consider Retrospect 4.0. Current users should absolutely upgrade—especially with the low upgrade price."

InfoWorld, July 14, 1997

RETROSPECT TURNS THE BIG 4.0!



*Retrospect 4.0
backs up data at
twice the speed.*

Everybody's favorite backup software has hit 4.0. And a true milestone it is!

Retrospect 4.0 is seasoned with enough real-life experience to perform like no other backup program.

Compared to version 3.0, it does more, it looks better, and it has big time performance improvements.

If you're a network administrator, new TCP/IP support means you'll back up twice as many computers in the same amount of time.

And we're talking huge volumes—up to a



Retrospect is totally compatible with the new Mac OS 8, so upgrading won't put you behind the eight-ball.

full terabyte—and millions of files. Installation is a breeze—4.0 can update every client on the net and you won't have to change a single script.

Everyone wants a smooth upgrade to Mac OS 8 and Retrospect is extraordinarily compatible with both Systems 7

and 8. Public service announcement:

Make sure to back up before you

make the move!

Speaking of smooth, now you can get backup status by email

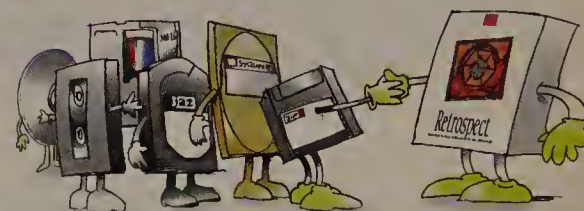
or pager. You, too, can have your beeper

go off at a dinner party just like the doctor next to you.

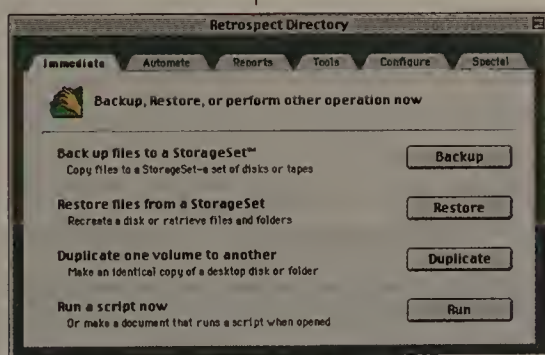
There's more. Now you can save a browser to a file, or export a catalog to a database. We've included a whole slew of custom drivers to assure compatibility with almost any drive you could name from tape to MO to CD-R. There's even an automatic reminder to clean the tape heads.



Celebrate Retrospect's big 4.0 with us—call 1-800-982-9981 and treat yourself to a high-speed upgrade.

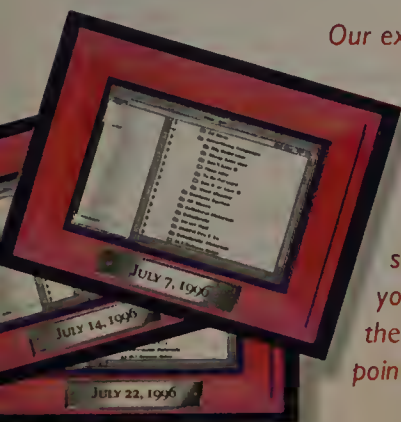


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Circle 26 on reader service card

Masterpiece MD-2300

STUNNING OUTPUT, SUPERSLOW PERFORMANCE

FOR UNDER \$500, YOU CAN BUY an ink-jet printer that produces color output that looks almost photographic. If you're willing to spend just a few hundred dollars more, you can make the leap from *almost* to *truly* photographic. The dry-ink-based Alps Masterpiece MD-2300 is slower and more expensive than its ink-jet counterparts, but its high-quality output is dramatically more impressive.



GIBSON

The MD-2300 doesn't spray liquid ink onto a page, as most ink-jet printers do. Instead, it transfers dry ink to the page from a set of four cartridges by means of a 240-element thermal print head. The MD-2300's two high-quality modes cater to different needs: photo-realistic mode produces acceptable output similar to that of lower-cost color ink-jets, while photographic mode produces 600-by-600-dpi continuous-tone images that resemble

costlier dye-sublimation output. A 1200-by-600 print mode is offered for gray-scale and black-and-white printing.

The printer's dry-ink cartridges are easy to handle and install. Because the printer automatically senses (via a bar code) which color is in each cartridge holder, they can be loaded in any order. You'll appreciate this convenience: to print in photographic-quality mode, you must remove all four standard ink cartridges and replace them with four photographic ink cartridges (\$12 apiece).

Top-quality photo printing also requires special photographic-quality paper, which costs more than \$1 per sheet. When you print in photographic-quality mode, the four dye-based photo inks are vaporized by the MD-2300's print head and sublimated into a porous layer of the paper, producing rich continuous tones. The output is gorgeous—crisply defined and deeply saturated, with almost no perceptible dithering.

The MD-2300 is a four-pass printer—inks from the four color cartridges are applied one at a time. Not surprisingly, this method makes for very slow printing. In its highest-photo-quality mode the MD-2300 took more than 17 minutes to output Macworld Lab's Adobe Photoshop file and more than 24 minutes to print an Adobe Illustrator file. The Epson Stylus Color 800—the Editors' Choice winner in our most recent roundup (see "The Best Personal Print-

ers," June 1997)—printed the same two images in high-quality mode in just 4.7 and 4.2 minutes, respectively.

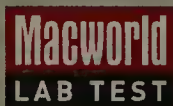
Although the MD-2300's photo-quality output is stunning, it doesn't fare as well when printing to plain paper. In its default mode, colors were mottled, output was unacceptably grainy, and text characters were wobbly and broken. In contrast, ink-jet printers like the Stylus Color 800 print well on plain paper.

Oddly, the MD-2300 isn't a serial printer; it connects to your Mac via the SCSI port. As a result, it brings along all the quirks of a SCSI device, including termination and SCSI IDs. Even worse, setting the MD-2300's SCSI ID involves cumbersome DIP switches, rather than the typical push button or dial found on most SCSI devices.

Macworld's Buying Advice

The Alps Masterpiece MD-2300 offers stellar photographic output, but its dismal speed, oddball SCSI connection, and weak plain-paper output make it a poor general-use printer. If you need a printer that does it all, consider Epson's far more versatile Stylus Color 800. But if you're looking for a second printer that can produce true photographic quality for under \$1000, the MD-2300 won't disappoint you.—JOSEPH SCHORR

RATING: ★★ ★/6.7 **PROS:** Stunning photographic output; easy-to-swap ink cartridges. **CONS:** Extremely slow; SCSI port connection required; poor-quality plain-paper output. **COMPANY:** Alps Electric USA (408/432-6000, www.alpsusa.com). **LIST PRICE:** \$970.



Alps MD-2300: Top Quality Takes Time

■ Best result in test. Shorter bars are better. Times are in seconds. ► New product.

Print Mode	Short Multi-font Memo	Long Single-Font Report	Spreadsheet	Illustration	Bitmapped Photograph	Newsletter	Web Browser
► Alps Masterpiece MD-2300—default	246	783	455	408	355	215	483
► Alps Masterpiece MD-2300—photo-realistic	260	785	543	489	431	249	515
► Alps Masterpiece MD-2300—photographic	NA	NA	NA	1458	1024	NA	NA
Epson Stylus Color 800—default	27	159	159	70	67	44	64
Epson Stylus Color 800—best	96	876	328	252	284	149	235
HP DeskJet 870 Cse—default	52	127	189	166	190	105	153
HP DeskJet 870 Cse—best	94	185	358	258	331	183	273

NA = Not applicable (not an appropriate use of this print mode).

Behind Our Tests

For detailed information on our methodology, see www.macworld.com/tests/.—Macworld Lab testing supervised by Mark Hurlow



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Rewritable CD Drives

CD RECORDERS BURN . . . AND BURN AGAIN

CD RECORDERS ARE HOT ITEMS, and with good reason. CDs offer high-capacity, long-lived media that's ideal for archival storage. But CD-R has one glaring limitation: you can only write a disc once. CD-Rewritable (CD-RW) technology changes all that. Microboards Technology's PlayWrite 2060RW and DynaTek Automation Systems' CDE260R both incorporate the new Ricoh MP6200S mechanism that lets you reuse discs up to 1000 times.



CDE260R (top) and PlayWrite 2060RW

CD-RW technology works much like CD-R, which burns dark spots into a layer of reflective material inside the disc media. But unlike CD-R, CD-RW burns semipermanent dots onto a layer of a metal alloy. Left alone, a CD-RW disc will hold data for 30 years or more. Reheat it to 200°C with a recording laser, however, and the data disappears and the disc becomes reflective again.

Unfortunately, that difference in media means standard CD-ROM and audio CD players cannot read CD-RW discs. Current CD standards require discs to be 70 percent reflective; the dye in CD-R discs comes close enough to be read in nearly all regular CD drives, but the alloy in a CD-RW disc is only 25 percent reflective, making the disc's dots invisible to a standard drive.

On the bright side, CD-RW technology is forward compatible. New Multi-Read (MR) CD-ROM drives—including DVD drives—will include an Automatic Gain Control circuit that compensates for the low reflectivity of CD-RW discs. Nevertheless, it will be

quite a while before you can assume other folks can access your CD-RW discs.

Luckily, CD-RW drives *can* burn standard CD-R discs, and CD-RW supports all the same CD formats as CD-R. CD-RW adds two erase functions: a standard erase takes as long as burning a whole disc; Quick Erase saves time by wiping only the disc's table of contents and the gap before the first track.

Both the DynaTek and Microboards drives ship with Adaptec's Toast CD-ROM Pro 3.5, which we praised for its clean, functional, and intuitive interface in our last CD-R roundup (see "Desktop CD Recorders," September 1996). Even so, the current version of Toast doesn't support all of CD-RW's features. You can't drag files to a rewritable CD, or from the CD to the Trash, as you can with other removable media. You *can* burn multisession CDs with Toast, but you can't selectively erase files.

CD-RW drives support Universal Disc Format (UDF)—a platform-independent file system designed to be more versatile than the current ISO 9660 standard—and packet writing, which allows you to drag files to a CD. At press time, UDF-capable software wasn't available for the Mac, although Adaptec hopes to ship a new version of Toast with UDF support by the time you read this.

Even though CD-RW has its limitations, performance isn't one of them. In our informal tests, the 2× write, 6× read Ricoh MP6200S mechanism burned a full 650MB CD in about 40 minutes—the same time as a 2× CD-R drive.

CD-RW isn't much pricier than CD-R, either, with its capabilities adding \$200 to typical 2× CD-R drive costs.

CD-RW discs cost around \$25 (to CD-R's \$5), but their reusability makes them more cost-effective. Compared with other rewritable formats—magneto-optical (MO), Zip, or Jaz—CD-RW's chief advantage is the low cost of storage media: less than half the cost per megabyte of Jaz or small-format MO media, and roughly a third that of Zip disks.

Macworld's Buying Advice

The PlayWrite 2060RW and CDE260R are virtually identical, even in price. CD-RW is hamstrung by its lack of UDF software and backward compatibility. Nevertheless, it works well . . . and it works now. It can't come close to magnetic media in speed, so consider all your needs carefully. If CD-RW fits the bill, you can be burning—and reburning—in no time.—PETER M STOLLER

CDE260R

RATING: ★★ ★/6.3 **PROS:** Low-cost media; full CD-R functionality; excellent software. **CONS:** Not backward compatible; slower than magnetic media; no Finder-level writing yet. **COMPANY:** DynaTek Automation Systems (902/832-3000, www.dynatek.ca). **LIST PRICE:** \$699.

PlayWrite 2060RW

RATING: ★★ ★/6.3 **PROS:** Low-cost media; full CD-R functionality; excellent software. **CONS:** Not backward compatible; slower than magnetic media; no Finder-level writing yet. **COMPANY:** Microboards Technology (612/470-1848, www.microboards.com). **LIST PRICE:** \$685.



Times on Par with CD-R's

Times are in minutes:seconds. Shorter bars are better. ▶ New product.

Product	Mechanism	Write Speed	RAM Cache	363MB Hard Drive	300MB MPEG Video
▶ DynaTek CDE260R	Ricoh MP6200S *	2X	1024K	29:17	25:55
MicroNet Master CD Plus	Ricoh RO1060C **	2X	512K	28:48	26:54

*Identical mechanism used in Microboards' product, Macworld Lab spot testing confirmed comparable results in both vendors' erasable drives. **CD-Recordable (nonerasable, nonrewritable).

Behind Our Tests

For detailed information on our methodology, see "Desktop CD Recorders," September 1996, or www.macworld.com/tests/.—Macworld Lab testing supervised by Matt Clark



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Low-End Databases

HELIX EXPRESS AND PHYLA TAKE A GRAPHICAL APPROACH

HELIX EXPRESS IS ONE OF THE oldest Mac database programs, and Phyla is one of the newest; where Helix builds on familiar relational structure, Phyla is object-oriented. But both offer a uniquely Mac approach to database construction: they let mere mortals use convenient graphical tools to create custom databases with little or no training.

The Basics

Programming Helix 4.5 still requires mastery of only a handful of icon types and their functions. Combined with its multiuser character (it's optimized for client-server setups), Helix's programming simplicity makes it the fastest way to build serious relational business applications. Helix Technologies has also updated the underlying database engine (which still runs in 1MB of RAM) to match the requirements of a PowerPC-based, networked world. One of those requirements is speed; in contrast to most mainstream

collection to another. Phyla's object diagrams give it an edge in the quick creation and debugging of complex database structures, but Helix's examples more closely resemble finished database products.

Phyla 2.0's programming strength, in contrast, is its use of classes rather than standard relational methods. For example, once you define the class *people* with name, address, and phone number as attributes, you can specify subclasses such as *customer* and *employee* that automatically inherit these attributes as database fields. You can quickly develop a repertoire of reusable classes and subclasses that covers every instance of *people*, from *OfTrafuror* to *Fortune500CEO*. The Phyla CD now contains an entertaining video tutorial that will help you set up fairly complex database applications even if you don't know anything about classes, objects, or inheritance.

Other database tasks have their own simple tools: straightforward graphics define relations between classes, and a user-friendly Calculation Editor generates calculated attributes (such as final price with sales tax). Once the database is completed, you can display it in the familiar list view or in form-type views you design yourself (see "Phyla Your Data").

Web Connectivity

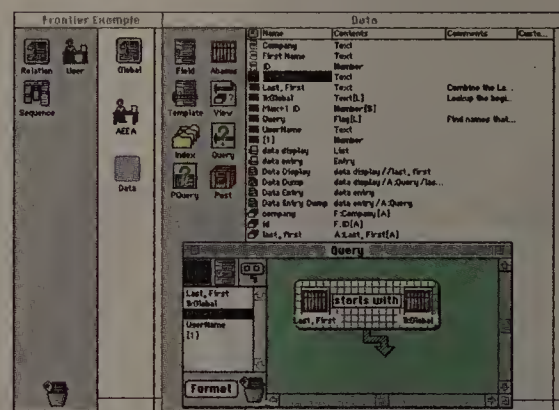
Rather than overhaul the basic structure of Helix 4.5 to add Web connectivity, Helix Technologies simply added Apple Event External Access and support for scripting in the form of Userland Frontier. This approach works because Helix provides scripts that manage the exchange of data between itself and Web pages (see "New Twist for Helix"), along with the data, forms, and operations that make up a custom database application. Unfortunately, this arrangement makes Helix's slogan, "The Database for People Who Don't Think in Code," a bit shaky; if you can't think in code, writing your own Web-oriented scripts will be a chore.

Phyla databases, like Helix collections, support multiple users concurrently on a LAN, and version 2.0's sophisticated new SmartObjects scheme lets dial-in users update the database remote-

ly. Version 2.0 also introduces AppleScript, in the form of scriptable, easy-to-use buttons that handle complex chores, and support for external events as a way to make Web contact. This scripting approach to the Web is at odds with Phyla's programming style and makes it a less-than-perfect tool for, say, posting a catalog on a Web site. But it *would* be the easiest tool for encapsulating complex, industry-specific functions.

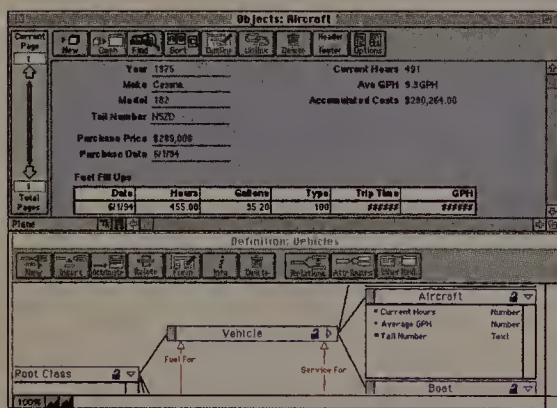
Macworld's Buying Advice

Both Helix Express and Phyla let non-programmers go beyond the usual database work of mailing lists and order



New Twist for Helix Helix's unique, icon-based programming method is drafted for Web database duty in version 4.5.

forms. One offers a decade of refinement; the other, a conceptual structure that's years ahead of competing Mac databases. Both need to add Web features, but even in their current form they're excellent tools for developing vertical-market databases.—CHARLES SEITER



Phyla Your Data The database specified by this futuristic Phyla object diagram (bottom) can still be viewed in mock-FileMaker style (top).

software, Helix gets faster with each release and now offers performance competitive with that of Mac business favorites ACI US 4th Dimension and Claris FileMaker Pro.

Besides a speed boost, Helix 4.5 features improved file security, automatic record-structure repair, an interface that at last conforms to Apple guidelines, useful text-styling enhancements, and better client-side password protection. But the biggest improvement is the ability to copy grouped complex objects from one Helix

Helix Express 4.5

RATING: ★★★★★/7.1 **PROS:** Improved performance; intrinsically multiuser; really useful sample databases. **CONS:** Scripting connection to Web difficult for nonprogrammers. **COMPANY:** Helix Technologies (847/465-0242, www.mcs.net/~hxtch/). **LIST PRICE:** \$795; client \$168 to \$249.

Phyla 2.0

RATING: ★★★★★/7.2 **PROS:** Flexible; multiuser; faster than FileMaker at most tasks. **CONS:** Real Web use takes serious scripting. **COMPANY:** Mainstay (805/484-9400, www.mstay.com). **LIST PRICE:** \$299; developer version \$599.

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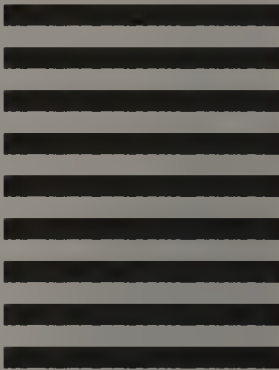
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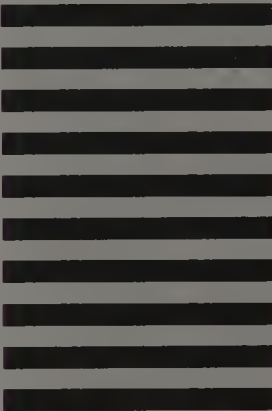
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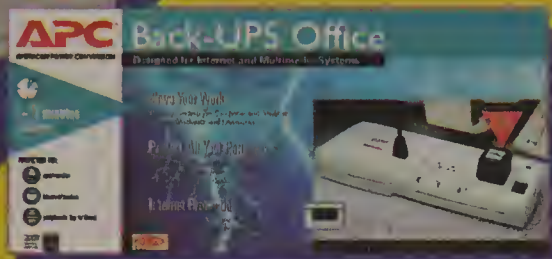


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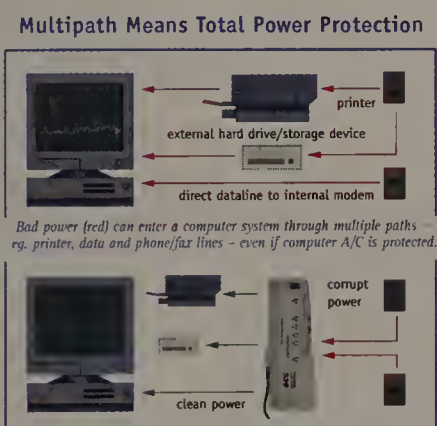
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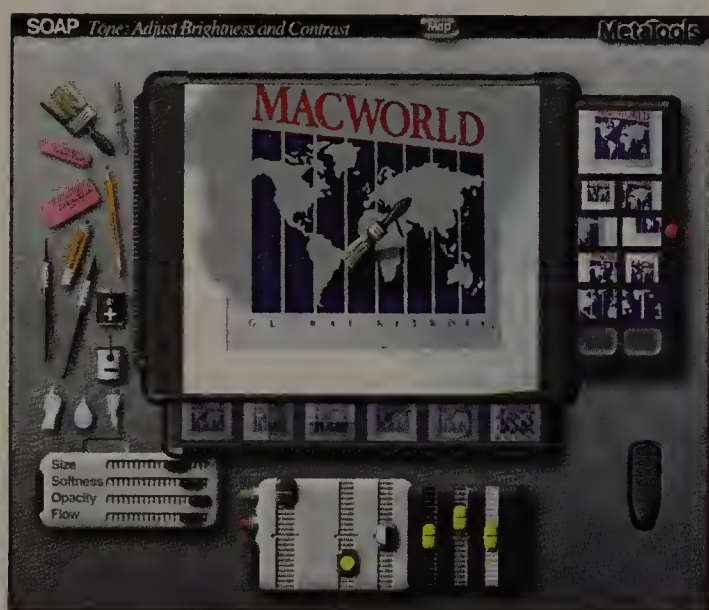
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Kai's Photo Soap

INEXPENSIVE PHOTO RETOUCHING
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KAI'S PHOTO SOAP HAS MANY features you'd expect in an entry-level image-editing program, plus a few extras. But befitting the *Kai* in its title (after Kai Krause, chief design officer for MetaCreations), the program implements these features in a most unconventional manner. In Kai's view, retouching a photo should be as



Tools of the Trade You can apply Soap's effects to the entire image, or paint them in selectively using one of the brushes. In the Tone Room you modify an image's brightness and contrast.

intuitive as adjusting the brightness on your TV set. That means dumping the traditional menu bars and dialog boxes found in ordinary software, and replacing them with colorful push-button gadgets that would look more at home in a stereo system. If you're accustomed to more-conventional graphics programs—even one as simple as Adobe's PhotoDeluxe—you'll find this approach hinders your productivity, but the target audience of graphics novices will love it.

When you run Soap, the familiar Macintosh interface transforms into a brave new "MetaWorld." It's a fun place where the tools and controls are works of interactive art. For starters, Soap's features are organized into seven virtual rooms, plus a Map Room that helps you navigate to other rooms. In these rooms, you can modify hue and saturation, crop and rotate photos, open images in various formats, fix exposure automatically, adjust brightness and contrast, add backgrounds and objects, erase scratches, soften tex-

tures, and fix red-eye problems. You can apply most of these effects to the entire image or to selected portions.

Although the program lacks conventional selection tools, it compensates by including brushes that let you paint effects into the portion of the image you want to modify. Inexperienced users will probably find this approach more intuitive than using a lasso or magic wand, but Soap's lack of selection tools precludes simple cut-and-paste operations. Soap also lacks support for Adobe Photoshop plug-ins, a curious omission on the part of the company that brought us Kai's Power Tools.

Soap's amusing interface presents the features in a seemingly logical manner. But you may find yourself bogged down as you go from room to room to access different tools. The irony of Soap's interface is that experts and novices will find it equally baffling if they dive in before reading the mercifully short manual.

Such productivity may be less important to graphics novices than to their professional counterparts, but in one respect Soap falls short even as a consumer product: when you run the software, it takes over your entire system. Even the menu bar disappears, blocking access to the Apple menu and other open apps. You can restore the menu bar, but only through a poorly documented keyboard shortcut or a control that appears in some of the rooms. Anticipate hunting through the program and manual to get your Mac back.

Macworld's Buying Advice

Despite its drawbacks, Kai's Photo Soap deserves points for originality—and you can't beat the bargain price. Consumers will adore it, but experienced photo retouchers will find it more a novelty than a serious graphics tool.—STEPHEN BEALE

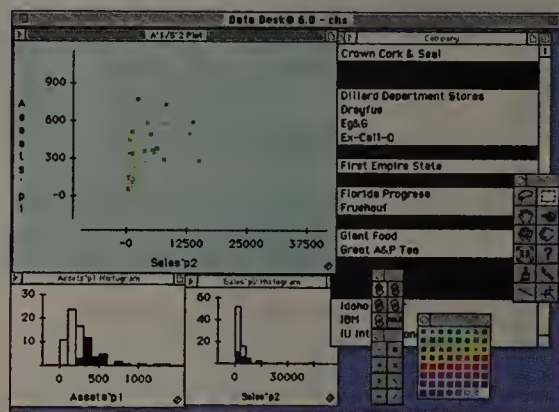
RATING: ★★★★★/8.0 **PROS:** Inexpensive; fun, innovative visual interface. **CONS:** Lacks selection tools and Photoshop plug-in support; hides Mac OS by default; unconventional approach creates bottlenecks for experienced users. **COMPANY:** MetaCreations (805/566-6200, www.metacreations.com). **LIST PRICE:** \$49.

Data Desk Plus 6.0

ANSWERS FROM NUMBERS, FAST

DATA DESK PLUS 6.0, THE LATEST release of Data Description's statistics pioneer, neatly sidesteps the "version 6 curse" that seems to plague software. After five major releases, developers have to decide whether to bloat the package with features nobody really wants or actually find a way to improve it. Data Description opted for the latter, and the result is a program that's better, not bigger.

Data Desk has always been the fastest statistics program and the one best suited to exploratory data analysis. Other programs offer larger libraries of statistics handbook texts, but Data Desk specifically exploits the Mac's graphics advantages to help you find patterns and relationships in your data. That leaves room for improvement in only three areas: interfacing Data Desk with the world of traditional statistics and non-Mac plat-



Seeing Is Believing The Data Desk approach is to graph data first, then do traditional tabular stats computations once patterns are revealed.

forms; supplementing it with teaching modules for the "I took stats five years ago and don't remember much" crowd; and boosting the speed.

Data Desk 6.0 addresses the first area with new features for string handling and file import and export. Taking into account that stats programs date back to the earliest days of computers, it offers dozens of antique punch-card-heritage formats for importing collections of data—for example, giant blocks of numbers and variables packaged as single long strings. The fixed-format options let you import such data sets with just a few dialog-box settings, then use the string functions to rename and reorder variables.

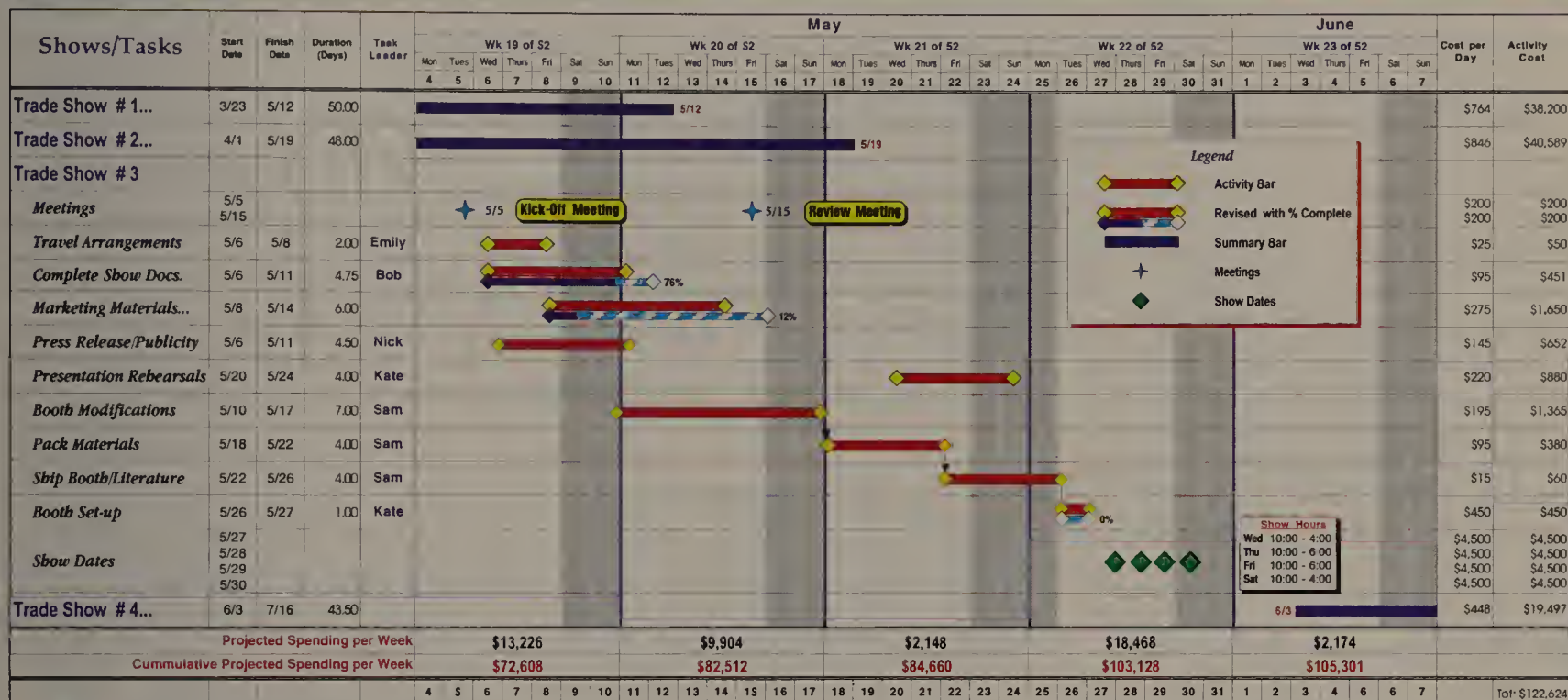
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Page 1 of 1



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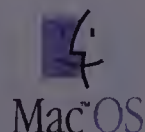


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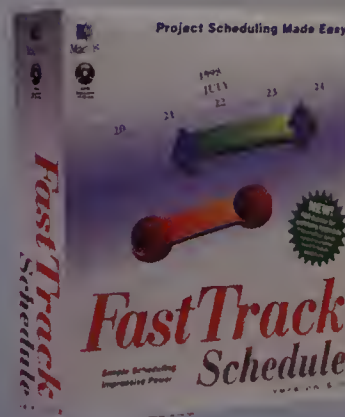
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Another development that integrates Data Desk with the rest of the statistics world is the introduction of feature-identical Windows 95 and NT versions. The correspondence is so exact that you could customize the Mac version to make its windows look like those in Windows, and files are completely interchangeable.

Release 6 ships with ActivStats (see *Reviews*, September 1997), the educational collaboration between Addison-Wesley and Data Description. The close correspondence between the Data Desk manual and ActivStats' demos, simulations, and exercises makes this the only professional statistics package that allows self-training for nonprofessionals.

Data Desk was always the fastest 680X0 program because it offered more Mac-specific code optimization than its early ported-from-DOS competitors (such as SPSS and StatSoft's Statistica) and other Mac originals (such as Abacus Systems' StatView and SAS's JMP). That justified Data Description's release of a fast-enough, partially Power Mac-native version 5.0 (see *Reviews*, March 1996), but Data Desk Plus 6.0's all-native code is amazingly fast on 603e and 604e systems: relational lookups between data sets, calculations on categorical data, and regression statistics are 1.5 to 6 times faster.

With the increased speed, some key interactive features effectively graduate from the classroom to the workplace. For example, basic graphical methods used in statistics classes still work when you jump from the 25-case studies of the classroom to the 25,000-case examples of real-life professional stats (for which graphical data exploration is too slow to be useful in most stats programs).

Macworld's Buying Advice

Data Desk has always been a good reason to own a Mac, and the latest version offers performance improvements and compatibility with other desktop machines and mainframes. As a package that's both friendly to beginners and capable of handling Census Bureau-size data sets, Data Desk Plus 6.0 is a triumph.—CHARLES SEITER

RATING: ★★★★★/9.1 **PROS:** Fastest, most interactive statistics program for the Mac. **CONS:** None. **COMPANY:** Data Description (607/257-1000, www.datadesk.com). **LIST PRICE:** \$795.

AT ANY GIVEN MOMENT, THE software on your Macintosh is almost certainly out of date. With patches and updates being released every day, keeping track of current versions can be a full-time job. Two new services, Insider Updates 1.01 and Shaman Update Server 1.1.6, track software updates (neither service offers upgrades or beta versions) and download

have your Mac shut down when they're complete. The only problem is that proxy-based firewalls effectively prevent Updates from functioning. Insider says a fix is in the works.

The enterprise-centric Shaman Update Server, in contrast, consists of a CD-ROM (updated monthly) that you install on a Power Mac file server, Shaman Scout client software for each Mac to be inventoried and updated, and access to an FTP site with more-current updates. The CD-ROM approach eliminates the need for FTP access, getting around the firewall problem and speeding the download process. Another advantage is that network administrators—not users—control the inventory and updating process. A related benefit of Shaman's enterprise focus is that maintaining an inventory of a network's hardware and software helps administrators manage software licenses, support hardware upgrade planning, and control software versions. And because the Shaman server summarizes each update publisher's Read Me file, administrators can get an overview of an update's features before installing it.

Macworld's Buying Advice

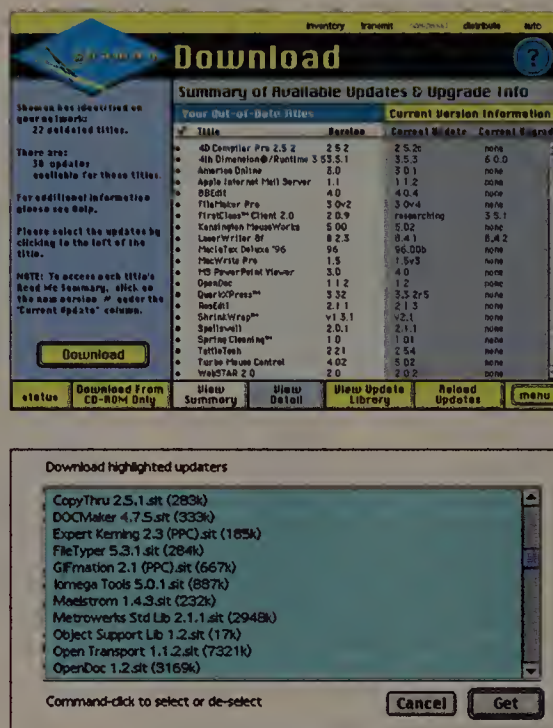
Insider Updates makes sense for individuals who need to keep their software up-to-the-minute, though not everyone will feel it's worth \$7 a month. Shaman Update Server offers better informational support for the update process, but it's definitely designed—and priced—for the corporate user.—MATTHEW LEEDS

Insider Updates 1.01

RATING: ★★★/5.9 **PROS:** Fairly simple to use. **CONS:** Can't pass a firewall. **COMPANY:** Insider Software (619/622-9900, www.theinside.com). **LIST PRICE:** \$84 per year.

Shaman Update Server 1.1.6

RATING: ★★★/6.9 **PROS:** Good inventory database reports; CD-based approach. **CONS:** Expensive. **COMPANY:** Shaman (415/241-9952, www.shaman-update.com). **LIST PRICE:** \$595 per year; client \$25 per year.



Keeping Current Shaman Update Server (top) and Insider Updates display a list of available updates; installers for the ones you select are downloaded to your Mac automatically.

the ones you choose, though you do the actual installation by launching the installers. Insider Updates focuses on the individual user, while Shaman Update Server is designed for networked environments, but both are timesaving alternatives to tracking down updates on your own.

Insider Software maintains a Web-based database and repository of software updates from nearly 2000 Macintosh developers. When you launch Updates, it connects to Insider's Web site and downloads a list of current updates. It then scans the local volumes on your Mac, creates an inventory of your installed software, and checks version information against the downloaded list. You can choose updates from this list, or simply have the program download all available updates via FTP. You can also schedule the downloads for a particular time and

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System Requirements: Any 68030 or higher Macintosh with at least 8MB RAM, color monitor and CD-ROM drive. Also accelerated for Power Macintosh.

CodeWarrior Professional

GEAR UP FOR CROSS-PLATFORM PROGRAMMING

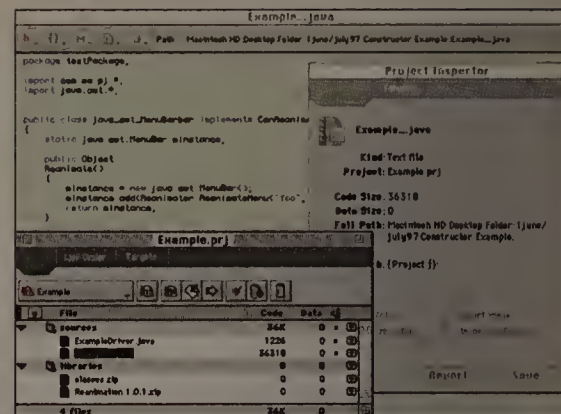
AS OPERATING SYSTEMS EVOLVE, programming tools must evolve along with them. That's been a difficult task this past year, with Mac OS 8, Rhapsody, Yellow and Blue Boxes, and the rise of Java as a mainstream language. But Metrowerks' release of CodeWarrior Professional 1.0, the follow-on to CodeWarrior 11, isn't a matter of playing catch-up; it's an ambitious attempt to create a Mac programming environment with a promising commercial future.

CodeWarrior Professional includes the current versions of Metrowerks' C, C++, Pascal, and Java compilers in an updated Integrated Development Environment. Because IDE 2.0 lets you select Java machines, Windows 95 and NT systems, and Macs as targets of the same project, CodeWarrior Pro effectively turns a Power Mac into a near-universal development system. The new environment also supports subprojects and multiple open projects, making it easier to organize reusable program parts, and finally offers fat binary (680X0 and PowerPC) as a project target. Most tool bars are now customizable; the

upgraded debugger works with Windows, Java, and Mac applications; and interfaces throughout the program meet Apple's "gray-scale appearance" spec for Mac OS 8.

The development environment and documentation (including almost a dozen online books) set new high standards, but you can expect to raise your own standards as well. Older Pascal code will likely generate some error messages, for example, and Metrowerks' Java Virtual Machine has both known and as-yet-undiscovered bugs, though the new IDE is great for managing Java projects (see "Something's Brewing"). Even C++ projects developed in CodeWarrior 11 may need adjusting to adapt to the changing details of the new version's library arrangement, and the new Project Converter utility may or may not do that automatically. Because the converters are still in the development stage, Mac C++ code generally won't work in Windows projects. Missing entirely is a Windows version of Constructor, a graphical developer's tool.

Macworld's Buying Advice Metrowerks didn't tack *Professional* onto this CodeWarrior as an afterthought; this is a



Something's Brewing The editor, debugger, and project-manager setup in CodeWarrior Pro is now the easiest Java entry point for C++ professionals.

product for developers who want the latest tools, need Java and Windows support, and won't faint at the prospect of updating some code. It's not yet a push-button coding tool, but it will take you into the Mac's Rhapsody-and-Java future.—CHARLES SEITER

RATING: ★★★★★/7.1 **PROS:** New IDE supports flexible project structures; good update of Java tools. **CONS:** Still a work in progress; incomplete Windows tools. **COMPANY:** Metrowerks (512/873-4700, www.metrowerks.com). **LIST PRICE:** \$599; academic price \$119.

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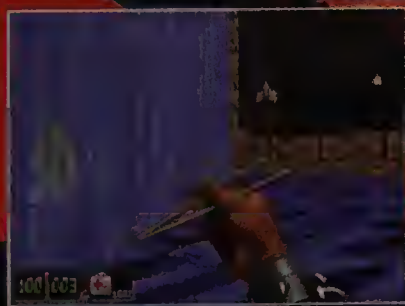
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Media Cleaner Pro 2.0

INNOVATIVE VIDEO-COMPRESSION UTILITY BUILDS IN WEB FEATURES

THE BEST VIDEO-COMPRESSION utility has just gotten better. Terran Interactive's Movie Cleaner Pro transformed this black art by combining advanced quality-enhancing options with an approachable interface that even compression neophytes could use (see *Reviews*, January 1997). The follow-on, Media Cleaner Pro 2.0, offers the same friendly operating style but performs several new tricks as well.

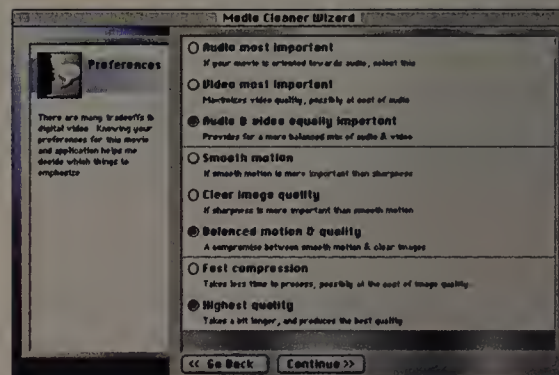
Like its predecessor, Media Cleaner Pro lets you work in two ways. If you're new to compression, you can let the Media Cleaner Wizard interrogate you about your movie's destination (CD-ROM or Web, for example), its target platform, whether audio is more important than video, and so on. Media Cleaner Pro then compresses the movie, displaying before-and-after results as it works.

Experienced compressionists can use Media Cleaner Pro's Settings window to fine-tune their compression options. All of Movie Cleaner Pro's optimizing settings are still here: the ability to apply a slight blur for better compression, video noise-reduc-

tion filters, and fade-in and fade-out options. But you can now adjust color balance, saturation, brightness, and white and black levels; a handy new preview window lets you see how your settings will affect the movie before you begin compressing.

Media Cleaner Pro also includes a new Adobe Premiere export module that lets the two programs communicate. In theory, this eliminates the need to render a final movie in Premiere and then import it into Media Cleaner Pro for compression. In practice, it's a bit cumbersome—you have to reconfigure Premiere's preview settings, for instance, and you can't take advantage of Media Cleaner Pro's excellent batch-compression features.

Where Movie Cleaner Pro needed a plug-in called Web-Motion to compress Web video, Media Cleaner Pro is Web-savvy right out of the box. It creates low-bandwidth movies and generates the HTML tags that embed them, and it supports several popular audio- and video-streaming technologies. But Media Cleaner Pro is actually a bit too far ahead of the curve; some encoder extensions are beta



The Wizard of Video Media Cleaner Pro's Media Cleaner Wizard determines compression settings based on information you supply.

versions. Visit Terran's Web site for updates.

Macworld's Buying Advice Media Cleaner Pro is a superb upgrade. Quick-Time tinkerers can get by with the compression features in their video-editing programs, but quality-obsessed moviemakers need Media Cleaner Pro.—JIM HEID

RATING: ★★★★★/8.0 **PROS:** Easy to use; superb compression quality; excellent documentation and Web support. **CONS:** Some streaming codecs still in beta; Premiere export module is cumbersome. **COMPANY:** Terran Interactive (408/278-9025, www.terran-int.com). **COMPANY'S ESTIMATED PRICE:** \$359.



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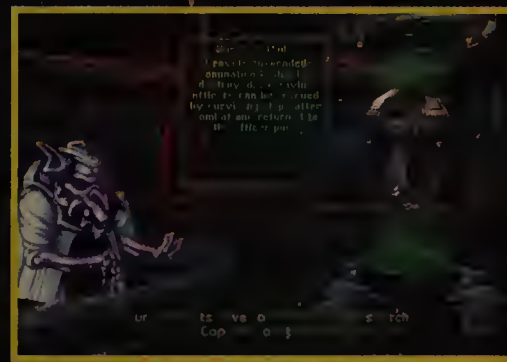
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WebRamp M3

SLOW, EXPENSIVE ALTERNATIVE TO ISDN

THE ROAD TO FAST DIAL-UP Internet access is neither smooth nor cheap: high-speed ISDN requires special phone lines and sophisticated hardware. Ramp Networks' WebRamp M3 tries to get around that roadblock by ganging up to three modems (not included), promising bandwidth as high as 168 Kbps. Unfortunately, the M3's performance falls far short of that goal.

Although a single modem connection worked fine for file transfers, easily hitting the modem's rated throughput, a second modem improved throughput only slightly, and three modems didn't always yield even a twofold improvement. The M3 works best with several users running Web browsers, which perform many short transfers that WebRamp can distribute among the modems. For data-intensive single-user access, such as an FTP file transfer, the M3 uses only one modem.

The modem-size WebRamp M3 features a built-in four-port Ethernet hub for attaching networked Macs and three RS-232 connectors for attaching modems. Setup is simple: you just set your Mac to



SUZANNE ROADY

dynamic IP addressing, connect it to the WebRamp M3 using the supplied Ethernet cable, and attach up to three modems (they need not be the same speed or from the same manufacturer).

A setup wizard walks you through the process of configuring the modems and the ISP connections. You need a separate Internet account for each modem, so figure that into your setup costs. Because the WebRamp's Dynamic Host Control Protocol (DHCP) server automatically assigns an IP address to each Mac or PC on your network, you simply set each computer's TCP/IP setting to Dynamic, and the WebRamp sets the appropriate values for you.

Like most Internet routers, the M3 makes going online a transparent process. It senses outbound Internet traffic and auto-

matically dials your ISP, disconnecting after a period of inactivity. You can configure the M3 to either dial all three modems simultaneously or dial one modem initially and use the others only when additional bandwidth is needed. Indicator lights show the status of each Ethernet port and modem, while the setup wizard's status page displays detailed messages and other diagnostics. The WebRamp M3 supports remote Telnet administration, but not SNMP, remote firmware upgrades, remote message logging, or multilevel password security.

Macworld's Buying Advice A fully loaded WebRamp M3 costs much more than a basic ISDN router, is considerably slower, and lacks ISDN's fast dial-up and data-compression abilities. And ISDN dial-up Internet access costs as much as or less than three modem Internet accounts, leaving only one reason for using the M3: you can't get ISDN.—MEL BECKMAN

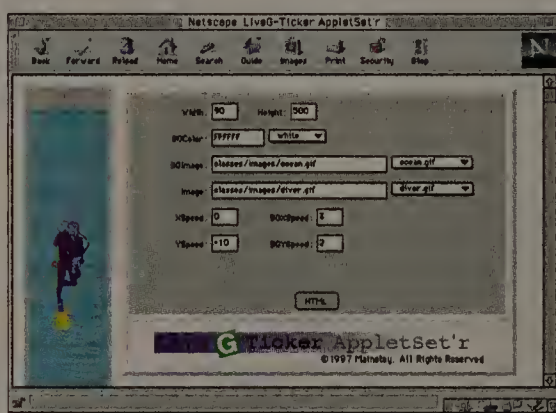
RATING: ★★/4.5 PROS: Web-based setup wizard; allows unlimited users; built-in Ethernet hub. **CONS:** Poor performance with two or three modems; no SNMP remote management; no remote firmware upgrade capability. **COMPANY:** Ramp Networks (408/988-5353, www.rampnet.com). **LIST PRICE:** \$439.

PageCharmer

AUTOMATIC WEB-PAGE PIZZAZZ

ABOUT A WEEK AFTER THE FIRST graphical Web browser (Mosaic) appeared, GIFs began popping up all over Web pages. Soon after that, Web-page thrill seekers began devising ways to load pages with sound and movies, sometimes producing wonders and sometimes producing bandwidth-hogging excrescences. Mainstay's PageCharmer 1.0 offers a compromise between plain pages and multimedia extravaganzas, making it easy to produce eye-catching effects with minimal space and speed requirements.

PageCharmer is a set of Java applets you can modify using pop-up menus (see "Beneath the Surface"). You can choose from applets that display animated marquees, buttons, scrolling tickers, and maps; all can include graphics or text (or both), links to other pages, and sound effects. When you're happy with the results, you simply click on a button to generate an HTML document with embedded Java code and classes. And if you load up PageCharmer's data folder with your favorite backgrounds and graphics, you can scale, position, and combine them, then pop them



Beneath the Surface This aquatic drama is just one of the thousands of moving-marquee scenes you'll find in PageCharmer. To customize the applet, you simply select elements from the pop-up menu.

onto a Web page, all in a matter of minutes.

The PageCharmer application itself is a set of linked HTML documents—a start page, a user's guide, and pages containing sample elements. Since the whole show displays live in the browser window, PageCharmer's built-in real-time controller (called AppletSet'r) shows you the results of your changes to text and graphics as soon as you choose them from the pop-up lists. The applets are small enough—10K or less—that you won't perceive much download-time difference between a plain-text page and a page with one or two active PageCharmer elements.

PageCharmer's applets ran with no glitches in Netscape Navigator 3.01 and 4.01, and the few display effects that didn't work properly in the Mac version of Microsoft Internet Explorer 3.0 worked fine in the Windows 95 version; a 3.0X version of Microsoft's browser will likely resolve the display problem.

If you're just thinking of putting a bit of glitz on your home page, a wide selection of freeware is available, as are cheaper Java tools such as Interactive Media's ActionLine (see *Reviews*, April 1997). But you can also buy pieces of the PageCharmer package separately; modules that produce image maps, buttons, marquees, tickers, graphics, and sounds are available for the more modest price of \$39.95 to \$69.95.

Macworld's Buying Advice Of all the Web tools developed so far, PageCharmer gives the greatest impact for the least effort. It produces compact Java code that executes quickly in current browsers, and it takes only minutes to learn.—CHARLES SEITER

RATING: ★★★★★/7.3 PROS: Produces nice visuals with minimal applet overhead. **CONS:** Priced for serious users. **COMPANY:** Mainstay (805/484-9400, www.mstay.com). **LIST PRICE:** \$139.95.



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SmartSound for Multimedia 1.6

UTILITY CREATES PRECISELY TIMED SOUNDTRACKS

SAY YOU NEED A MUSICAL interlude to accompany a 39-second scene in a multimedia project. Your stock-audio CD-ROM clips only come in 30- or 60-second lengths. Stretching a 30-second clip may distort the sound, and editing a 60-second clip manually could take forever. Sonic Desktop Software's SmartSound for Multimedia 1.6 is a better alternative. The program includes a library of canned soundtracks and a program that lets you create tracks of specific lengths. Because the music clips are meticulously indexed, SmartSound can create custom-length tunes by assembling chunks of each clip.

SmartSound's CD-ROM includes 74 minutes of music—jazz, rock, classical, country and western, and more. The audio comes in 22kHz, 16-bit format—not 44.1kHz CD-quality, but fine for CD-ROM and Web work, as well as presentations and corporate or educational videos. (A CD with 44.1kHz, 16-bit versions costs an additional \$99.) Sonic Desktop Software also sells a second CD of just music for \$69.95. Several large music libraries—including The Music Bakery (615/370-4256, [www](http://www.musicbakery.com)

[.musicbakery.com](http://www.musicbakery.com)) and Killer Tracks (213/957-4455, www.killertracks.com)—will offer SmartSound-encoded CDs this fall.

You can take two routes to song building with SmartSound. If you're just getting started, you can use the program's Maestro, a series of dialog boxes that lets you specify a song length and style, then preview and select from a variety of choices (see "Music, Maestro!"). You can export the results in AIFF, WAV, AU, RealAudio, Sound Designer II, or QuickTime-movie formats. Maestro does an amazing job; my tests yielded tracks that were logically structured and precisely timed, even when I specified oddball lengths such as 7.3 seconds.

For more control, SmartSound's editor window displays a song's chunks and lets you drag and drop them into place. You can use the editor to build a tune from scratch or to refine one created using Maestro. The editor also lets you import QuickTime movies. This feature, new in SmartSound 1.6, makes it easy to score a movie: you import the flick and choose a base tune, and SmartSound automatically creates a soundtrack of the appropriate length.



Music, Maestro! SmartSound's Maestro window (top right) walks you through soundtrack building, or you can assemble songs yourself.

Macworld's Buying Advice As someone who has edited music by manually splicing audiotape and by using a sound-editing program, I'm amazed by SmartSound's ability to generate accurately timed, musically appealing soundtracks. SmartSound for Multimedia is the perfect pain reliever for soundtrack-timing headaches.—JIM HEID

RATING: ★★★★★/8.1 **PROS:** Well-designed interface; excellent results. **CONS:** CD-quality audio costs extra. **COMPANY:** Sonic Desktop Software (818/718-9993, www.sonicdesktop.com). **LIST PRICE:** \$199.95.

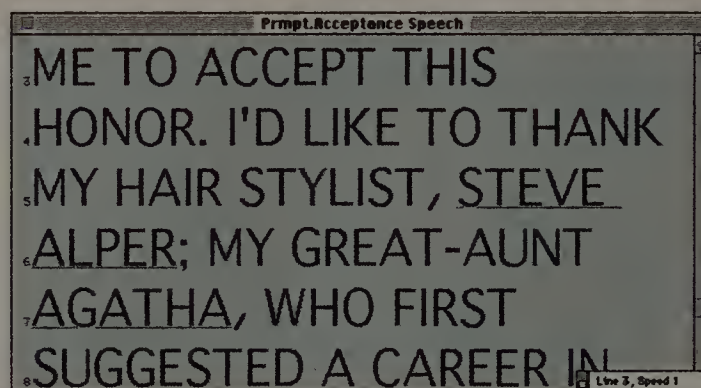
TalentPrompter

BARE-BONES PROMPTER DOES THE JOB

WHEN PRESIDENTS, NEWS anchors, corporate executives, or infomercial shills speak on camera, they read from a smoothly scrolling screen projected near the camera's lens. TalentPrompter, a tiny, home-brewed program, turns your Macintosh into a similar machine for under \$100.

The photocopied manual introduces TalentPrompter as "a bare-bones, minimum-required-to-do-the-talent-prompting-job piece of software." But the manual writer (who's also the software designer) gives himself too little credit. True, the program has its setbacks. It offers only a monochrome interface and a single font and size: a custom, all-caps, compressed-Helvetica-like font whose letters are about an inch tall. And you can't resize TalentPrompter's text window; it's designed for a 640 by 480 screen, and that's all you get. But the font and screen size easily pass the legibility test. Fortunately, the rest of the program is as full-featured as you could wish.

For example, you can pause scrolling by pressing the spacebar—great for accommodating unanticipated digressions or



You Can Always Tell-a-Prompter TalentPrompter offers an optional floating windoid (lower right) that shows your current scrolling speed and line number.

interruptions. Number keys control the scrolling speed, from 1 (slowest) to 9 (fastest). You can even tweak the speed that each number references—ideal if you find the default slow setting too poky, or the super-speed-reading setting too fast. And as you'd expect, the up- and down-arrow keys control the scrolling direction.

Ideally, you create your text in a word processor, then import it into TalentPrompter. Fortunately, you can also edit your speech within the program; the built-in text processor offers Cut, Copy, Paste, Print, Export, Underline, and Find/Replace commands. Its rival, SpeechPrompter, prohibits tweaking text once it's imported into the program (see *Reviews*, June 1997).

A handful of nice touches complement the basics of this program. Tiny line numbers let producers direct actors to "take it from line 58." TalentPrompter also offers a Reverse Image command that lets you copy text onto a second monitor via a 45-degree one-way mirror—just as professional TV stations do.

Macworld's Buying Advice TalentPrompter is a practical, reliable, reasonably priced tool for presenters. Just don't expect the bells and whistles of the big guys—there's no Claris-like interface or Microsoft-style feature list. TalentPrompter's designer, a veteran producer of hundreds of TV shoots and corporate videos, created the program for his own use. The software contains just the right number of features—no more, no less.—DAVID POGUE

RATING: ★★★/6.6 **PROS:** Smooth scrolling; intuitive keyboard shortcuts; integrated text-editing features. **CONS:** Fixed window size and font; somewhat home-brewed manual and packaging. **COMPANY:** John Stanley Training Programs (408/374-1235, www.si-inc.com/prompter/). **LIST PRICE:** \$95.

Star Ratings

HARDWARE AND SOFTWARE PRODUCTS AT A GLANCE

Macworld's Star Ratings let you compare Macintosh products based on the authoritative assessments in our reviews and features.

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Software

BUSINESS

- ★★★★/8.1 **4th Dimension 6.0**, ACI US, 408/252-4444, \$299. Classic relational database does Windows and the Web. *Aug 97, p. 62*
- ★★/3.8 **ePaper 1.5**, Second Glance Software, 360/692-3694, \$169. Offers some markup tools, but if you're serious about OCR, invest in a dedicated package. *Jun 97, p. 64*
- ★★/3.8 **FormTyper 1.0**, Visioneer, 510/608-0300, \$19.95. Forms software is cheap and easy to use, but

it's too underpowered. *Aug 97, p. 54*

- ★★★★/7.3 **Informed Designer 2.0**, Shana, 403/433-3690, \$295. If you're serious about forms, this feature-rich designer can't be beat. *Aug 97, p. 54*
- ★★★★/8.5 **MYOB Accounting 7**, BestWare, 201/586-2200, \$89.95 to \$139.95. Entry-level accounting package combines ease of use and power. *May 97, p. 69*
- ★★★★/8.6 **Now Contact and Up-to-Date 3.6.5**, Now Software, 503/274-2800, \$99.95. Personal info-management duo gets connected to the Net. *Jun 97, p. 70*
- ★★★★/5.7 **OmniForm 2.0**, Caere, 408/395-7000, \$149. Accurate but quirky program is handy if you need to scan existing forms. *Aug 97, p. 54*
- ★★★★/7.8 **Spreadsheet 2000 2.01**, Casady & Greene, 408/484-9228, \$110. This LKISS successor is ready for business. *Jul 97, p. 68*
- ★★★★/5.0 **ViewOffice PowerSuite**, NewSoft, 510/445-8600, \$79. Inexpensive scanning with solid image-editing tools but unimpressive OCR features. *Jun 97, p. 64*

GRAPHICS

- ★★/4.8 **3D WalkAround 1.0**, Abracadata, 541/342-3030, \$99.99. Unsuitable for architectural projects, but fine for simple interior space planning. *Jun 97, p. 81*
- ★★★★/7.0 **ColorWeb 1.0**, Pantone, 201/935-5500, \$29.95. Simple, inexpensive color picker and swatch book move to the Web. *May 97, p. 84*
- ★★★★/7.9 **Eye Candy 3.0**, Alien Skin Software, 919/832-4124, \$199. Eye-catching Photoshop filters, and lots of 'em. *Aug 97, p. 58*
- ★★★★/8.2 **Flash 2.0**, Macromedia, 415/252-2000, \$199. Cool features differentiate this midprice front-runner from the rest of the Web animation pack. *Sep 97, p. 62*
- ★★★★/7.2 **Illustrator 7.0**, Adobe Systems, 415/961-4400, \$595. Slight upgrade marks a new beginning for venerable graphics app. *Aug 97, p. 46*
- ★★★★/7.4 **ObjectDancer 1.1**, PaceWorks, 415/261-6180, \$445. Offers precise timeline and object-oriented animation controls. *Sep 97, p. 62*
- ★★★★/9.1 **Painter 5**, MetaCreations, 408/430-4100, \$449. Painter is still demanding to learn, but no artist should be without it. *Sep 97, p. 65*
- ★★★★/7.8 **PhotoTools 1.1**, Extensis, 503/274-2020, \$99.95. Polished collection of Photoshop fil-

ters includes a great text plug-in. *Aug 97, p. 58*

- ★★★★/7.0 **Texture Creator 2.0**, Three D Graphics, 310/553-3313, \$129.99. Pro-level features in a beginner's package. *Aug 97, p. 76*
- ★★★/5.4 **Vertigo 3D Dizzy**, Vertigo Technology, 604/684-2113, \$119. Despite an uncooperative 3-D environment and limited lighting tools, this plug-in offers a simple, relatively inexpensive way to incorporate 3-D models into Photoshop and Illustrator images. *Sep 97, p. 80*
- ★★★/6.4 **Virtual Home Space Builder 2.0.4**, ParaGraph, 408/364-7700, \$49. VRML 2.0 authoring program has limited modeling features. *Aug 97, p. 68*
- ★★★★/7.5 **WalkThrough Pro 2.6**, Virtus, 919/467-9700, \$495. Best choice to quickly and elegantly create an architectural walk-through. *Jun 97, p. 81*
- ★★★/6.0 **WebAnimator 1.1**, DeltaPoint, 408/648-4000, \$49.95. Limited drawing tools and motion controls make it best suited for static animations like banner ads and simple logos. *Sep 97, p. 62*
- ★★★/6.9 **WebPainter 1.0**, Totally Hip Software, 604/685-6525, \$99.95. Simple interface yields quick but choppy results; adequate tool for no-frills animations. *Sep 97, p. 62*

INTERNET/NETWORKING

- ★★★★/6.9 **Apple VideoPhone Kit 1.5**, Apple Computer, 408/996-1010, \$279. Camera/software combo offers good, basic videoconferencing. *Aug 97, p. 56*
 - ★★★★/8.2 **Claris EMailer 2.0**, Claris, 408/727-8227, \$49. E-mail innovator gets a face-lift and speed boost. *Jul 97, p. 52*
 - ★★★★/7.0 **Claris Home Page 2.0**, Claris, 408/727-8227, \$99. Web authoring tool is great for building small to medium-size sites. *May 97, p. 56*
 - ★★★/5.1 **CometPage 1.0.5**, Digital Comet, 415/331-5551, \$149. Makes it easier to create dynamic Web pages—as long as you're comfortable working with HTML. *Jul 97, p. 70*
 - ★★★★/8.1 **CommuniGate 2.8**, Stalker Software, 415/383-7164, free (5 users) up to \$600 (200 users). Fast, reliable multimedia messaging suite adds new features. *Jun 97, p. 86*
 - ★★★/5.7 **Connectix VideoPhone 2.01**, Connectix, 415/571-5100, \$99. May be a good solution for high-speed networks without existing bugs. *Aug 97, p. 56*
- continues*

REAL PRODUCTS REAL RATINGS

Reviews you can trust: Unlike other publications, Macworld rates only final shipping products, not prototypes. What we review is what you can actually buy.
Outstanding ★★★★★ = 9.0–10.0 Very Good ★★★★ = 7.0–8.9 Good ★★★ = 5.0–6.9 Flawed ★★ = 3.0–4.9 Unacceptable ★ = 0–2.9

Star Ratings

- ★★★★/8.8 **CyberGauge 2.0**, Neon Software, 510/283-9771, \$139 (2 devices) to \$695 (20 devices). The only low-entry-cost, low-effort network monitoring tool around. *Sep 97, p. 82*
- ★★★★/8.1 **CyberStudio 1.0**, GoLive Systems, 415/463-1580, \$349. Excellent user interface and precise controls; a near-perfect application. *Aug 97, p. 104. Editors' Choice* for best Web publishing tool for small-business sites.
- ★★★★/7.3 **Dave 1.0**, Thursby Software Systems, 817/478-5070, \$179. Painless Mac file sharing on Windows networks. *May 97, p. 72*
- ★★★★/6.4 **Enhanced CU-SeeMe 2.0**, White Pine Software, 408/446-1919, \$69. Color-capable version has good low-bandwidth videoconferencing, but unimpressive audio. *Aug 97, p. 56*
- ★★/4.8 **FrontPage 1.0**, Microsoft, 206/882-8080, \$149. Helpful automation, peculiar interface, exorbitant hardware demands. *Aug 97, p. 104*
- ★★/4.1 **Globetrotter Web Publisher 1.1.1**, Akimbo Systems, 510/843-6888, \$99. Intriguing automated functions, but murky design and documentation. *Aug 97, p. 104*
- ★★★★/7.0 **Home Page 2.0**, Claris, 408/727-8227, \$99. Slightly more features than PageMill but occasional preview lapses. *Aug 97, p. 104*
- ★★/4.2 **HoTMetaL Pro 3.0**, SoftQuad, 416/544-9000, \$159. HTML tags and image previews provide little meaningful feedback. *Aug 97, p. 104*
- ★★/4.9 **Insta.html 1.0**, Trailer Parc Technologies, 415/248-1350, \$179. Overpriced plug-in has trouble with FreeHand-to-Web conversion. *May 97, p. 82*
- ★★★★/7.5 **Internet Gateway 3.7.3**, Vicom Technology, 415/691-9520, \$249 to \$750. Network router software offers speedy Internet connections. *Jul 97, p. 70*
- ★★★★/8.6 **LinkUPPP 1.1**, FCR Software, 617/494-1300, \$59. Intelligent log-in, detailed diagnostics, and an elegant interface make PPP dial-up networking a snap. *Sep 97, p. 82*
- ★★★★/7.8 **NetMinder 4.0.2**, Neon Software, 510/283-9771, \$795. Network analyzer makes monitoring and problem diagnosis easy. *Aug 97, p. 78*
- ★★★★/7.7 **NetObjects Fusion 2.0**, NetObjects, 415/482-3200, \$695. Its expensive but it's still the best Web authoring tool. *Sep 97, p. 70*
- ★★★★/7.4 **PageMill 2.0**, Adobe Systems, 408/536-6000, \$149. A straightforward approach with first-rate previewing capabilities. *Aug 97, p. 104. Editors' Choice* for best Web publishing tool for personal sites.
- ★★★/6.9 **Phantom 2.0**, Maxum Development, 630/830-1113, \$395. Web crawler lets you build your own search pages. *Jul 97, p. 78*
- ★★★/5.4 **Presto Personal Page 2.5**, NewSoft, 510/445-8600, \$49.99. Modest features with average implementation, but easy to use. *Aug 97, p. 104*
- ★★/3.6 **QuickSite 1.0**, DeltaPoint, 408/648-4000, \$99.95. Automatically generates entire sites at a time, but feature set is tiny. *Aug 97, p. 104*
- ★★★★/7.5 **RunShare 2.1**, RUN, 201/529-4600, \$399 (2 users) up to \$2499 (25 users). AppleTalk network tool revs up file transfers by 250 to 400 percent. *Jun 97, p. 86*
- ★★★★/7.2 **Visual Cafe 1.0**, Symantec, 541/334-6054, \$199.95. Faster, easier Java coding, great for creating applets from scratch. *May 97, p. 67*
- ★★★★/7.2 **Visual Page 1.0**, Symantec, 541/334-6054, \$99.95. Resembles PageMill, but has less-convenient access to key features. *Aug 97, p. 104*

★★/3.5 **WebWatcher 4.1.1**, Caravelle, 613/225-1172, \$295 to \$999. Web-site monitor doesn't live up to its name. *Aug 97, p. 72*

MEDIA

- ★★★★/8.5 **Aurorix 2.0**, DigiEffects, 415/841-9901, \$289. From aged film to earthquakes, Aurorix's 26 usable effects are creatively designed. *May 97, p. 118. Editors' Choice* for best After Effects plug-ins.
- ★★★★/8.1 **Berserk 1.3**, DigiEffects, 415/841-9901, \$289. This After Effects plug-in has great fog, blizzard, laser, and star-field effects. *May 97, p. 118. Editors' Choice* for best After Effects plug-ins.
- ★★★★/7.7 **Boris Effects 2.1 MP**, Artel Software, 617/451-9900, \$350 to \$695. Best Adobe Premiere and Media 100 plug-in; adds motion graphics, keying, and transition effects. *May 97, p. 118. Editors' Choice* for best Premiere and Media 100 plug-ins.
- ★★★★/7.4 **CameraMan 3.0**, Motion Works Group, 604/685-9975, \$69.95. A must-have for CD-ROM producers and interactive training. *Sep 97, p. 88*
- ★★/3.7 **CD Speedster**, Synchronys Softcorp, 213/340-4100, \$29.95. Provides modest CD acceleration, but only in limited cases. *Jul 97, p. 58*
- ★★★★/7.5 **Cyclonist 1.0**, DigiEffects, 415/841-9901, \$495. This particle-generation specialist is a complex After Effects plug-in. *May 97, p. 118*
- ★★/1.5 **d-Time**, Acceleration Software, 206/224-3727, \$59.95. This CD-ROM accelerator is disappointing across the board. *Jul 97, p. 58*
- ★★★★/8.2 **Director 6 Multimedia Studio**, Macro-media, 415/252-2000, \$999. Bundle offers great value with enhanced authoring and great Web features. *Sep 97, p. 56*
- ★★★★/6.4 **Dynamic Effects 1.0**, Gryphon Software, 619/536-8815, \$119. A solid but uninspiring filter plug-in collection for Adobe Premiere. *May 97, p. 118*
- ★★★★/8.3 **Final Effects AP 1.0**, MetaTools, 805/566-6200, \$199. Ideal for Adobe Premiere-based particle generation and distortion. *May 97, p. 118*
- ★★★★/8.2 **HoloDozo 1.0**, M.M.M. Software, hologozo@mmmsoft.com, \$149. Novel Adobe Premiere plug-in has a clever interface, uses QuickDraw 3D. *May 97, p. 118*
- ★★★★/8.9 **KPT Final Effects 3.0.1**, MetaTools, 805/566-6200, \$695. This superb effects collection works with Adobe After Effects. *May 97, p. 118*
- ★★★★/8.9 **Lens Flare Pack 1.5**, Knoll Software, 415/453-2471, \$129. This After Effects plug-in generates unmatched lens flare effects. *May 97, p. 118. Editors' Choice* for best After Effects plug-ins.
- ★★★/6.7 **LightWave 3D 5.0**, NewTek, 303/448-9700, \$1495. Pro-level animation program lacks interface elegance. *May 97, p. 74*
- ★★★★/6.8 **PageMaker 6.5**, Adobe Systems, 408/536-6000, \$895 (estimated). Even with a wealth of new features, still can't beat QuarkXPress. *May 97, p. 48*
- ★★★★/8.4 **Studio Effects 1.0**, MetaTools, 805/566-6200, \$695. Adobe After Effects plug-ins include 3-D particle generator and great spotlight effects. *May 97, p. 118*
- ★★★★/7.0 **SuperCard 3.0**, Allegiant Technologies, 619/587-0500, \$329 (estimated). Veteran authoring tool gets a cool Web plug-in; a few Web-related bugs. *May 97, p. 58*
- ★★★/6.4 **TransFX 1.0**, DigiEffects, 415/841-9901, \$45. Inexpensive and fun transition collection for Adobe Premiere. *May 97, p. 118*
- ★★★★/7.5 **TypeCaster 2.0**, Xaos Tools, 415/538-7000, \$199. 3-D text plug-in renders beautiful text that you can animate. *May 97, p. 118*
- ★★★/6.8 **Ultimatte for Macintosh 2.0**, Ultimatte, 818/993-8007, \$1495. Complex, costly plug-in does an unmatched job of keying. *May 97, p. 118*

UTILITIES

- ★★★★/8.8 **Video SpiceRack 1.0**, Pixélan Software, 360/647-0112, \$179. Novel plug-in collection has more than 300 transition and effect gradients. *May 97, p. 118*
- ★★★★/7.6 **ActivStats 1.0**, Addison-Wesley Benjamin/Cummings, 800/822-6339, \$29.95. A complete basic statistics package that's great for all-around use. *Sep 97, p. 66*
- ★★★★/7.2 **Adobe Type Manager Deluxe 4.0**, Adobe Systems, 408/536-6000, \$99.95. New font manager module proves you can teach an old dog new tricks. *Sep 97, p. 130. Editors' Choice* for best utilities.
- ★★★/6.8 **Adobe Type Reunion Deluxe 2.0**, Adobe Systems, 408/536-6000, \$60. Organizes fonts in the Font menu; lets you rename fonts or display them in their own typeface. *Sep 97, p. 130. Editors' Choice* for best utilities.
- ★★★★/7.7 **AliasDragger 1.0b1**, Leonard Rosenthal, free. One-note freebie makes alias creation a snap. *Sep 97, p. 130. Editors' Choice* for best utilities.
- ★★★★/7.7 **BigThesaurus 2.1**, Deneba Software, 305/596-5644, \$29.95. Most complete, easiest-to-use electronic thesaurus around. *Sep 97, p. 130. Editors' Choice* for best utilities.
- ★★★/5.8 **Bookends Plus 4.0**, Westing Software, 415/945-3870, \$129. Reference manager adds powerful Web functions. *Jul 97, p. 76*
- ★★/3.8 **Common Ground 3.0.1**, Hummingbird Communications, 415/917-7300, \$195. Portable document program can't match Adobe Acrobat. *Jul 97, p. 72*
- ★★★★/9.3 **Conflict Catcher 4.0.2**, Casady & Greene, 408/484-9228, \$99.95. Nearly perfect, and virtually essential, start-up document manager. *Sep 97, p. 130. Editors' Choice* for best utilities.
- ★★★★/7.6 **Cumulus Desktop 3.0**, Canto Software, 415/905-0300, \$99.95. Affordable multimedia database offers power and a superior interface. *Jun 97, p. 68*
- ★★★★/7.8 **DiskExpress II 2.21**, Alsoft, 281/353-4090, \$89.95. Intelligently defragments hard drives for optimum performance. *Sep 97, p. 130. Editors' Choice* for best utilities.
- ★★★★/8.1 **DragStrip 2.0.1**, Natural Intelligence, 617/876-4876, \$59.95. Versatile, feature-packed file launcher well worth the premium price. *Sep 97, p. 130. Editors' Choice* for best utilities.
- ★★★/6.8 **Fetch 1.5**, Extensis, 503/274-2020, \$99.95. Multimedia database has cool features but lacks flexibility and ease of use. *Jun 97, p. 68*
- ★★★/6.8 **FloStat 2.0**, Senecio Software, 419/352-4371, \$149 (\$49 student version). Fast statistical analysis software designed for the social sciences. *Sep 97, p. 66*
- ★★★/6.8 **Font Box 2.1**, Insider Software, 619/622-9900, \$29.99 (Personal Edition) to \$169.95 (Network Edition). Font organizer is helpful, but not a panacea. *Aug 97, p. 74*
- ★★/3.0 **Front Office 1.6 LE**, STF Technologies, 816/220-0100, \$59. A bad temp wouldn't garble your phone messages this badly. *Jun 97, p. 66*
- ★★/3.9 **Image Alchemy PS 2.1.4**, Handmade Software, 510/252-0101, \$495. An expensive—and unreliable—solution to service-bureau crises. *Jul 97, p. 60*
- ★★★/5.7 **InfoGenie 2.0**, Casady & Greene, 408/484-9228, \$79.95. Updated information manager adds links to Web browsers. *Jun 97, p. 84*
- ★★/3.8 **Internet Voice Mail 3.0**, VocalTec, 201/768-9400, \$29.95. Internet Voice Mail has limited functionality and is full of bugs. *May 97, p. 80*

continues

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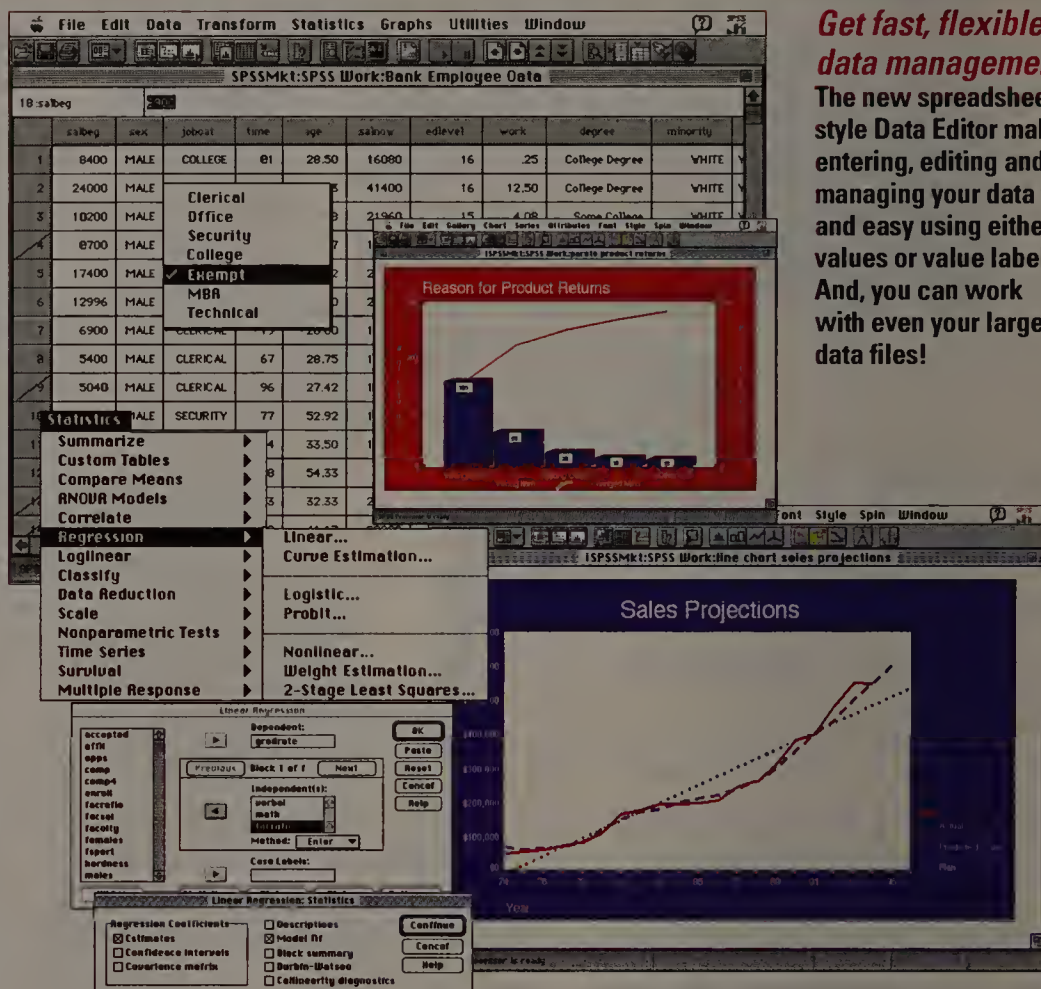
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Star Ratings

- ★★★★/8.3 **Kensington Mouseworks 5.02**, Kensington Microware, 415/572-2700, sold with input devices. Superior control over cursor movements and input-device button functions. *Sep 97, p. 130. Editors' Choice for best utilities.*
- ★★★/6.9 **KeyQuencer 2.1**, Binary Software, 310/449-1481, \$39.95. Upgrade adds Internet controls, kills bugs; still requires programming. *Sep 97, p. 76*
- ★★★★/8.8 **LetterRip 1.0.2**, Fog City Software, 408/454-1405, \$295. Mailing-list server is simpler and cheaper than ListStar. *Jun 97, p. 77*
- ★★★★/8.3 **ListStar 1.1**, StarNine Technologies, 510/649-4949, \$499. Serious mailing-list management with industrial-strength tools. *Jun 97, p. 77*
- ★★★/6.9 **MacA&D 6.0**, Excel Software, 515/752-5359, \$1995. A first-rate, real-world collection of CASE tools, but it needs an update. *Sep 97, p. 84*
- ★★★★/7.2 **MAE 3.0**, Apple Computer, 408/996-1010, \$459. Mac-in-the-box for Unix workstations. *Jun 97, p. 73*
- ★★★★/8.1 **MATLAB 5**, The MathWorks, 508/647-7000, \$1795. Still the fastest route to solutions in industrial math. *Jul 97, p. 74*
- ★★★★/8.1 **MiniCAD 7**, Diehl Graphsoft, 410/290-5114, \$795. CAD champion gets a solid upgrade. *Sep 97, p. 73*
- ★★/4.3 **Now Synchronize 1.0**, Now Software, 503/274-2800, \$39.95. Disastrous PDA-to-PIM link for Pilot. *Aug 97, p. 70*
- ★★★★/7.3 **Numbers & Charts 1.0.1**, Adrenaline, 418/658-9909, \$149.95. OpenDoc spreadsheet parts show the promise of component software. *Aug 97, p. 64*
- ★★★★/7.2 **OmniPage Pro 7.0**, Caere, 408/395-7000, \$499. OCR package has improved interface but not accuracy. *Jun 97, p. 83*
- ★★★/6.6 **Online Army Knife 1.2**, JEM Software, 303/422-4766, \$69.95. Add-on spelling checker is fast and Internet-savvy but has some rough edges. *Jun 97, p. 62*
- ★★★★/7.1 **Prism 2.0**, GraphPad Software, 619/457-3909, \$495. Ideal statistics package for the "wet" sciences—chemistry, biology, and so forth. *Sep 97, p. 66*
- ★★★★/7.4 **Pro FORTRAN 5.0**, Absoft, 810/853-0050, \$899. Formidable compiler suite has faster compiled programs and a better debugger. *Jul 97, p. 80*
- ★★★★/8.2 **QuickKeys 3.5.2**, CE Software, 515/224-1995, \$119. The best compromise between power and ease of use in a macro utility. *Sep 97, p. 130. Editors' Choice for best utilities.*
- ★★★★/8.6 **RAM Doubler 2.0.1**, Connectix, 415/571-5100, \$99. As much as triples your RAM. *Sep 97, p. 130. Editors' Choice for best utilities.*
- ★★★★/7.7 **Roaster Release 3**, Roaster Technologies, 617/876-4031, \$99. The most powerful Java tools for the Mac, now in a "nondeveloper" version. *Sep 97, p. 80*
- ★★★/6.2 **Scorpio 1.1**, Abbott Systems, 914/747-4201, \$29. Minuscule word processor's price is its best feature. *Sep 97, p. 78*
- ★★★★/8.0 **ScrapItPro 5.33**, John V. Holder, www.northcoast.com/~jvholder, \$20 shareware fee. Edit text, copy part of an image, and find items by title or contents in up to 20 open scrapbooks. *Sep 97, p. 130. Editors' Choice for best utilities.*
- ★★/2.2 **Screen To Screen 1.02**, Power On Software, 612/317-0344, \$149.95 two-machine license. This educator-oriented screen sharing program has some serious flaws. *Sep 97, p. 68*
- ★★/4.7 **SoftWindows 95 4.0**, Insignia Solutions, 408/

327-6000, \$349 to \$379 (estimated). Faster than before, but still no match for hardware solutions (or a PC). *Jul 97, p. 54*

- ★★/2.6 **SpeechPrompter**, Orator Company, 619/420-9150, \$89.95. Prompter software's jerky scrolling makes index cards look good. *Jun 97, p. 88*
- ★★★★/7.2 **Speed Doubler 2.0.1**, Connectix, 415/571-5100, \$99. Upgrade boosts network transfer times, same speed as prior versions. *May 97, p. 52*
- ★★★★/7.8 **Spell Catcher 1.5.7**, Casady & Greene, 408/484-9228, \$59.95. Fast, well-designed spelling checker. *Sep 97, p. 130. Editors' Choice for best utilities.*
- ★★/4.8 **Spellswell Plus 2.1.1**, Working Software, 408/423-5696, \$14.95. Add-on spelling checker doesn't live up to its name. *Jun 97, p. 62*
- ★★★/6.0 **SpellTools 1.2.1**, Newer Technology, 316/943-0222, \$19.95. Add-on spelling checker has text-to-speech feature but no interactive checking. *Jun 97, p. 62*
- ★★★★/7.3 **StuffIt Deluxe 4**, Aladdin Systems, 408/761-6200, \$129.95. If you got it off the Internet, StuffIt can almost certainly decompress it for you. *Sep 97, p. 130. Editors' Choice for best utilities.*
- ★★★/6.9 **StyleScript 3.5**, Infowave, 604/473-3600, \$149. PostScript solution works . . . for some ink-jets. *Aug 97, p. 67*
- ★★/3.0 **System Sculptor 2.01**, Colourfull Creations, 810/749-3013, \$29.95. Bare-bones utility for managing extensions. *Aug 97, p. 72*
- ★★/4.0 **Tailor 2.0**, EnFocus Software, 303/393-7282, \$369. A weak interface and unreliable performance hinder its troubleshooting talents. *Jul 97, p. 60*
- ★★★★/7.9 **Tex-Edit Plus 2.0.1**, Tom Bender, members.aol.com/tombb/, \$10 shareware fee. Cleans up messy, downloaded text files effortlessly. *Sep 97, p. 130*
- ★★★★/7.5 **Typelt4Me 4.7**, Riccardo Ettore, 72277

.1344@compuserve.com, \$30 shareware fee. Automatically expands user-defined abbreviations in any application. *Sep 97, p. 130*

- ★★★★/7.3 **TypeTamer 1.1.8**, Impossible Software, 714/470-4800, \$59.95. Groups fonts in the Font menu into families and user-defined sets. *Sep 97, p. 130*
- ★★★★/8.8 **Virex 5.7**, Datawatch, 508/988-9700, \$99. Great virus-detection features, checks downloaded Internet files for viruses. *May 97, p. 78*
- ★★★/6.8 **Virtual PC 1.0**, Connectix, 415/571-5100, \$149. Slow-but-steady emulator—at a lower price than SoftWindows 95. *Sep 97, p. 58*
- ★★★★/8.0 **Wingz 2.1.1**, Investment Intelligence Systems Group, 913/663-4472, \$399. Powerful programming tool disguised as a spreadsheet. *May 97, p. 71*

Hardware

MISCELLANEOUS HARDWARE

- ★★★★/8.1 **ADB I/O**, BeeHive Technologies, 818/304-0664, \$199. Hardware add-on lets you achieve total control of your home appliances. *Sep 97, p. 86*
- ★★★/6.3 **CD Stomper**, Stomp, 714/250-6771, \$79.95. Of the two labeling kits tested, CD Stomper is clearly the better product. *Aug 97, p. 60*
- ★★★/5.1 **FM Radio 1.1**, La Cie, 503/520-9000, \$49.95. If you want to listen to the radio, you're better off buying a boom box. *Jun 97, p. 90*
- ★★★/5.0 **MessagePad 2000**, Apple Computer, 408/996-1010, \$949. This Newton's finally useful, but it's priced out of the realm of sanity. *Jul 97, p. 69*
- ★★/4.6 **Neato CD Labeler Kit**, Neato, 203/466-5170, \$79.95. Neato can't hold a candle to the CD Stomper. *continues*

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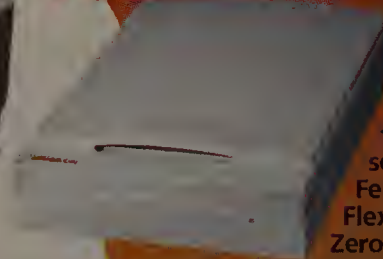
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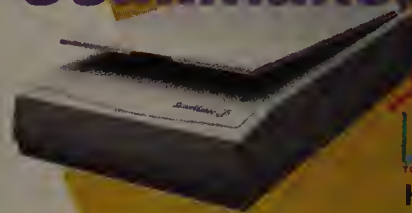
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Star Ratings

per. Aug 97, p. 60

- ★★★/6.6 **NoHands Mouse**, Hunter Digital, 310/471-5852, \$199.95. Foot-operated mouse offers a hands-free alternative. Jun 97, p. 83
- ★★★/6.9 **OrangePC 540**, Orange Micro, 714/779-2772, \$2456. Windows 95 compatibility card offers Pentium speed at a Pentium price. Jul 97, p. 54
- ★★★★/7.5 **Orbit Trackball**, Kensington, 415/572-2700, \$69.95. A well-designed, attractive mouse alternative. Aug 97, p. 70
- ★★/4.7 **Pippin @World**, Bandai Digital Entertainment, 310/404-1600, \$499.99; \$69.99 for keyboard. Costly Internet-connection and games device has poor image quality. May 97, p. 64
- ★★★★/8.4 **PowerKey Pro 600**, Sophisticated Circuits, 206/485-7979, \$199. A power strip for gadget freaks. Sep 97, p. 87
- ★★★/6.7 **Signature CD Color Printer**, Fargo, 612/941-9470, \$1295. If you produce a lot of CDs, this printer is a good investment. Aug 97, p. 60
- ★★★/6.8 **WebTV Internet Terminal**, Sony, 888/772-7669, \$349.95; \$79.95 for keyboard. Expensive, easy-to-use Internet-connection device has nice interface. May 97, p. 64

MODEMS/NETWORKS

- ★★★/6.8 **Courier V.Everything 56 K**, U.S. Robotics, 847/982-5010, \$395. If you're not ready for setup hassles, wait until 56K technology is more mature. Jul 97, p. 67
- ★★★/6.5 **DataShuttle 256**, RNS, 805/968-4262, \$1395. Card allows superfast, two-line ISDN file transfers. Jun 97, p. 75
- ★★★★/8.6 **InterJet**, Whistle Communications, 415/577-7000, \$1995 to \$2395. All-in-one hardware-and-software combo gets your office on the Internet. Jun 97, p. 60
- ★★★★/8.3 **Network Server 700/200**, Apple Computer, 408/996-1010, \$11,800. Server offers networking horsepower and high-speed I/O. May 97, p. 54
- ★★★★/8.4 **QuickStream Pro**, Sonic Systems, 408/736-1900, \$999. Remote-access server offers Web administration, eases telecommuting access. Jul 97, p. 80
- ★★★★/8.2 **Workgroup Server 8550/200**, Apple Computer, 408/996-1010, \$4200. An affordable 200-MHz medium-duty Internet server that's easy to use. May 97, p. 54

PRINTERS

- ★★★/6.7 **Color LaserWriter 12/660 PS**, Apple Computer, 408/996-1010, \$6100 (estimated). Lower price and more RAM than its predecessor, but still middle of the pack. Jun 97, p. 56
- ★★★★/7.8 **DeskJet 870Cse**, Hewlett-Packard, 408/246-4300, \$599. Color ink-jet printer offers good speed and image quality. Jun 97, p. 125
- ★★★/6.9 **IBM Network Color Printer**, IBM, 404/238-1234, \$8999. Its speed and output won't disappoint you, but it's not a good deal. Jun 97, p. 56
- ★★★/6.2 **LaserJet 5M**, Hewlett-Packard, 408/246-4300, \$2229. Laser printer is easily upgraded and offers top-notch software. Jun 97, p. 125
- ★★★/6.0 **LaserJet 6MP**, Hewlett-Packard, 408/246-4300, \$1149. Laser printer offers middling performance and excellent software. Jun 97, p. 125
- ★★★/6.0 **LaserWriter 12/640 PS**, Apple Computer, 408/996-1010, \$1599. Laser printer has good speed

and image quality for the price. Jun 97, p. 125

- ★★★/5.2 **Personal LaserWriter 4/600 PS**, Apple Computer, 408/996-1010, \$899. This expensive laser printer is slow and has nonstandard memory. Jun 97, p. 125
- ★★★★/9.1 **Stylus Color 800**, Epson America, 310/782-0770, \$449. Color ink-jet printer is fast with outstanding image quality. Jun 97, p. 125. **Editors' Choice** for best personal printer.

STORAGE

- ★★★★/7.4 **1.0GB Jaz**, Club Mac, 714/768-8130, \$499. Speedy third-party Jaz drive is hobbled by poor manual and missing refinements. Aug 97, p. 115
- ★★★/6.6 **1.0GB Jaz D2/Stol**, La Cie, 503/520-9000, \$469. Third-party Jaz drive crawls at barely half the speed of Iomega's own. Aug 97, p. 115
- ★★★/6.8 **2.6GB Optical**, ClubMac, 714/768-8130, \$1699. Optical drive offers middle-of-the-road price, performance, and features. Aug 97, p. 115
- ★★★/6.6 **540MB MCD D2/Stol**, La Cie, 503/520-9000, \$249. Slowest mid-capacity removable hard drive is no match for the APS M540. Aug 97, p. 115
- ★★★/5.7 **640MB MO D2/Stol**, La Cie, 503/520-9000, \$499. Poorest-performing medium-capacity optical drive is not a good buy. Aug 97, p. 115
- ★★★/6.2 **640se**, Maxoptix, 510/353-9700, \$685. Comparably priced and almost as speedy as the APS 640 MO, this drive is a reasonable choice. Aug 97, p. 115
- ★★★/6.3 **Apex 4.6GB**, Pinnacle Micro, 714/789-3000, \$1695. Space-age case fails to make up for surprisingly poor performance. Aug 97, p. 115
- ★★★/5.5 **APS 230 MO**, APS Technologies, 816/483-1600, \$379.95. Optical drive performs better than the Sys.230/SCSI, but it's no bargain. Aug 97, p. 115
- ★★★/6.4 **APS 640 MO**, APS Technologies, 816/483-1600, \$599.95. Best-performing medium-capacity optical drive is a good buy. Aug 97, p. 115
- ★★★★/8.1 **APS Jaz**, APS Technologies, 816/483-1600, \$499.95. This third-party Jaz drive comes closest to matching Iomega's. Aug 97, p. 115. **Editors' Choice** for best removable hard drive.
- ★★★/7.2 **APS M540**, APS Technologies, 816/483-1600, \$299.95. Top-performing mid-capacity removable is ideal for budget watchers. Aug 97, p. 115
- ★★★/5.9 **DynaMO 640**, Fujitsu, 408/432-6333, \$499. Second-place speed for a medium-capacity MO and few amenities. Aug 97, p. 115
- ★★★/6.7 **EZFlyer 230**, SyQuest, 510/226-4000, \$199. The Zip's nearest competitor has modest performance at a low price. Aug 97, p. 115
- ★★★/6.8 **HammerDisk 2600**, StreamLogic, 818/701-8400, \$2509. Good performance but few amenities and a very high price. Aug 97, p. 115
- ★★★/5.6 **HammerDisk PE 640**, StreamLogic, 818/701-8400, \$809. Highest-priced medium-capacity MO doesn't have great performance. Aug 97, p. 115
- ★★★/7.2 **Hammer Jaz Solo 1000**, StreamLogic, 818/701-8400, \$589. Highest-priced third-party Jaz with only modest performance and a so-so warranty. Aug 97, p. 115
- ★★★/8.3 **Jaz**, Iomega, 801/778-1000, \$399. The Jaz drive to beat: good price, warranty, performance, and design. Aug 97, p. 115. **Editors' Choice** for best removable hard drive.
- ★★★/6.8 **Nomai 540**, Nomai, 800/556-6624, \$299. Pocket-size removable hard drive lacks essentials. Aug 97, p. 115
- ★★★/5.2 **PD**, Panasonic, 800/742-8086, \$499.95. Its ability to read CD-ROMs and play CDs doesn't offset its slothfulness. Aug 97, p. 115
- ★★★/5.4 **PDI 5110**, ProDirect, 612/941-1805, \$399. Dismal performance and weak documentation hinder.

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Star Ratings

der low-capacity removable hard drive. *Aug 97, p. 115*

- ★★★★/6.2 **PDI 5200**, ProDirect, 612/941-1805, \$499. Higher capacity and better performance than the PDI 5110, but still no bargain. *Aug 97, p. 115*
- ★★★★/7.2 **PowerMO 2600/SCSI**, Olympus, 516/844-5000, \$1799. Fastest optical drive is well designed and reasonably priced. *Aug 97, p. 115. Editors' Choice* for best optical drive.
- ★★★★/7.5 **RMD 1.0 ISD-G1/FWB**, DynaTek, 902/832-3000, \$516. Middle-of-the-road Jaz drive is slower than most but reasonably priced. *Aug 97, p. 115*
- ★★★★/7.1 **ROS 4.6 PSD-G2/FWB**, DynaTek, 902/832-3000, \$2012. Slower than others, but with twice the capacity at almost the same price. *Aug 97, p. 115. Editors' Choice* for best optical drive.
- ★★★★/6.6 **SCSI Express 2600SME**, Micro Design International, 407/677-8333, \$1995. Slowest drive in this size group also has lowest price. *Aug 97, p. 115*
- ★★★★/7.6 **SyJet 1.5GB**, SyQuest, 510/226-4000, \$499. Highest-capacity removable hard drive is speedy but sensitive to SCSI-chain length. *Aug 97, p. 115*
- ★★★/5.2 **Sys.230/SCSI**, Olympus, 800/347-4027, \$359. Drive has low capacity and poor performance at a price that's no bargain. *Aug 97, p. 115*
- ★★★/5.8 **Zip**, Iomega, 801/778-1000, \$149. Best-selling removable is glacially slow but exceptionally cheap. *Aug 97, p. 115*

VIDEO DISPLAY

- ★★★/6.1 **AlphaScan 711**, Sampo Technology, 770/449-6220, \$599. Unbeatable price for a great picture; limited color features and on-screen controls. *Jul 97, p. 117*
- ★★★/6.0 **AlphaScan 760**, Sampo Technology, 770/449-6220, \$799. Screen is beautiful, but on-screen controls are ugly and not user-friendly. *Jul 97, p. 117*
- ★★★★/7.4 **AppleVision 1710**, Apple Computer, 408/996-1010, \$799 (estimated). Fine picture, affordable price, plus excellent software control interface. *Jul 97, p. 117*
- ★★/3.9 **Crystal Lake 17**, Pacom Data, 408/764-0590, \$549. Sharp picture and rock-bottom price, but limited features and controls. *Jul 97, p. 117*
- ★★★★/7.2 **Diamond Pro 87TXM**, Mitsubishi Electronics America, 714/220-2500, \$829. Solid image quality, great controls—all at a realistic price. *Jul 97, p. 117*
- ★★★/5.5 **DJ702e-M**, Mag Innovision, 714/751-2008, \$659. Good image quality and a good price, with cool hardware controls. *Jul 97, p. 117*
- ★★★/5.5 **DX700T-M**, Mag Innovision, 714/751-2008, \$799. Sharp image, sensible controls, but picture's too dim to make the first rank. *Jul 97, p. 117*
- ★★★/6.2 **EO75-M**, Princeton Graphic Systems, 714/751-8405, \$799. Terrific picture and low price with iffy controls and chintzy swivel. *Jul 97, p. 117*
- ★★★/5.8 **EO76-M**, Princeton Graphic Systems, 714/751-8405, \$799. Despite poor on-screen controls, it's a fair deal with good picture and price. *Jul 97, p. 117*
- ★★★/6.5 **FlexScan FX-C5**, Eizo Nanao Technologies, 562/431-5011, \$948. Good-looking, but has somewhat mystifying hardware controls. *Jul 97, p. 117*
- ★★★/6.7 **FlexScan TX-C7S**, Eizo Nanao Technologies, 562/431-5011, \$1299. Excellent image quality and software interface, but it's exorbitantly expensive. *Jul 97, p. 117*

- ★★★★/7.0 **Mazellan 17PX**, Hansol Multitech, 714/562-5151, \$899. Affordable, good image quality, and highly functional hardware controls. *Jul 97, p. 117*
- ★★★/6.4 **Multigraph 447Xi**, Nokia Display Products, 415/331-4244, \$925. Great color and great controls, but the price is above average. *Jul 97, p. 117*
- ★★★/5.1 **Multiple Scan 1705 Display**, Apple Computer, 408/996-1010, \$649 (estimated). Good image quality, but tends to bloom at high brightness. *Jul 97, p. 117*
- ★★★/6.8 **Multiscan 17sell**, Sony Computer, 408/894-0555, \$999 (estimated). A slight magenta cast and high price tag, but otherwise a good choice. *Jul 97, p. 117*
- ★★★★/7.5 **Multiscan 200sf**, Sony Computer, 408/894-0555, \$799 (estimated). Excellent quality display plus an elegant interface and surprisingly affordable. *Jul 97, p. 117. Editors' Choice* for best 17-inch monitor.
- ★★★/7.3 **MultiSync P750**, NEC Technologies, 630/775-7900, \$899 (estimated). Worth the money for its brilliant picture and great on-screen controls. *Jul 97, p. 117*
- ★★★/6.9 **MultiSync XV17+**, NEC Technologies, 630/775-7900, \$749 (estimated). Richly colored picture and superb controls—a good bargain. *Jul 97, p. 117*
- ★★★★/7.1 **Optique V773**, ViewSonic, 909/869-7976, \$599. The best combo of image quality and controls we've seen for under \$600. *Jul 97, p. 117*
- ★★★/6.7 **PanaSync S17**, Panasonic Computer, 201/392-4500, \$729. A sensible choice—good picture, controls, price, and support. *Jul 97, p. 117*
- ★★★/6.4 **PanaSync/Pro P17**, Panasonic Computer, 201/392-4500, \$899. High-quality image, controls, and support, like its lower-price sibling, the S17. *Jul 97, p. 117*

- ★★★/6.9 **Pivot 1700**, Portrait Displays, 510/227-2700, \$1099. Unique pivoting feature isn't cheap, but it's the only one in town. *Jul 97, p. 117*
- ★★★/6.4 **PT775**, ViewSonic, 909/869-7976, \$999. Good image quality and controls, but price doesn't match performance. *Jul 97, p. 117*
- ★★★/5.3 **RasterOps SuperScan Mc 600**, Hitachi/NSA, 617/461-8300, \$799. Slightly clunky controls but decent picture—a good choice for the budget-minded. *Jul 97, p. 117*
- ★★★/5.1 **RasterOps SuperScan Mc 611**, Hitachi/NSA, 617/461-8300, \$949. Merely average image quality for the price, and hard-to-see controls. *Jul 97, p. 117*
- ★★★★/8.9 **Sony GDM-W900**, Sony Electronics, 408/955-5142, \$4999. A wide-screen monitor for the color connoisseur. *Jun 97, p. 84*
- ★★★★/7.1 **SyncMaster 17GLi**, Samsung Electronics America, 201/229-4000, \$789. Affordable, good-looking display with smart, snazzy controls. *Jul 97, p. 117*
- ★★★★/7.0 **SyncMaster 17GLSi**, Samsung Electronics America, 201/229-4000, \$1019. Outperforms the 17GLi, has custom color controls, but at a big price hike. *Jul 97, p. 117*
- ★★★/6.8 **VisionMaster 17**, Iiyama North America, 215/957-6543, \$799. Great image quality at a very good price; slightly convoluted controls. *Jul 97, p. 117*
- ★★★★/7.2 **VisionMaster Pro 17**, Iiyama North America, 215/957-6543, \$899. Beautiful, feature-rich, and sensibly priced; slightly confusing controls. *Jul 97, p. 117*
- ★★★/5.4 **Visual Sensations VS-9**, KDS, 714/379-5599, \$753. Good-looking display, but inelegant controls and inflexible swivel stand. *Jul 97, p. 117*
- ★★★/5.5 **WyseVision WY-782D**, Wyse Technology, 408/922-4300, \$949. Compelling picture and price, but marred by awkward controls. *Jul 97, p. 117* **m**

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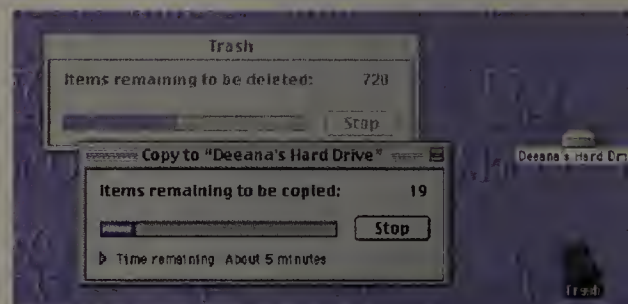
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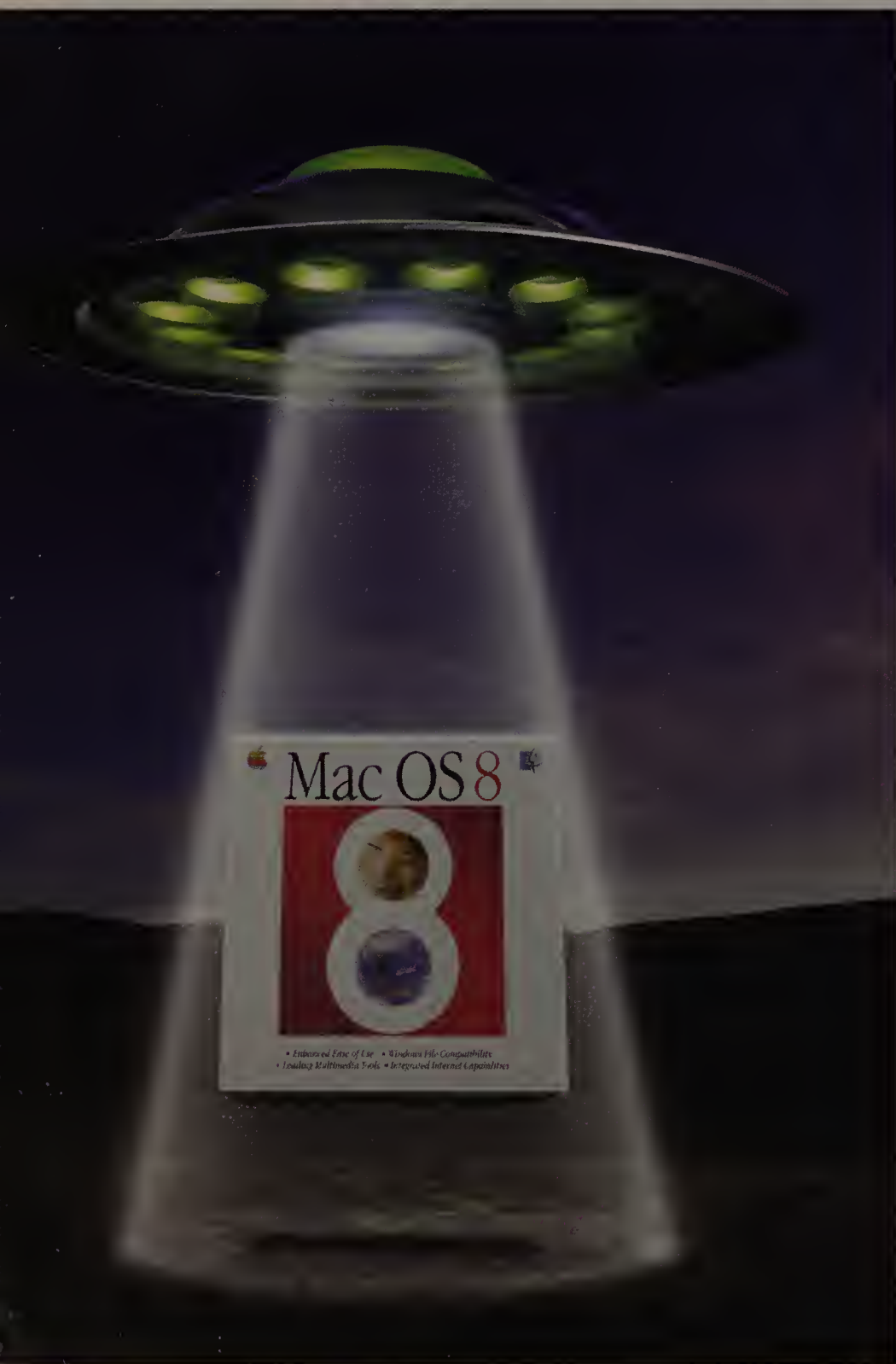


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that's out of this world. Mac OS 8 has integrated Internet capabilities. Netscape Navigator™, the PointCast Network, Internet Explorer and a new Internet Setup Assistant are built right in, making it easier than ever to get on the Net, to email, surf or browse the cosmos*. And to show that Mac OS 8 comes in peace, it can read Windows files, whether you have the original application or not. It's also compatible with most of your existing Mac applications. Mac OS 8 is designed for 68040 and PowerPC™ based systems, and features reliability improvements that'll have you glad you went with the power of 8.

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What a difference 8 makes.



Mac Superguide

MACWORLD SELECTS THE BEST MAC OS SYSTEMS

Edited by Allyson Bates

Looking for a new Macintosh? Confused about what new model to buy? Look no further. Each month, the *Mac Superguide* provides *Macworld's* picks for the best Mac OS systems. Typically we recommend an Editors' Choice winner and two runners-up. Current recommendations, however, may have changed from last month's based on the present lineup and price changes.

You'll also find *Macworld* Star Ratings and Macworld Lab performance benchmarks for all Mac OS systems shipping as we went to press in late July 1997. You may read about other Mac models in *Macworld* and elsewhere, but those are prototypes not yet available—the only systems rated here are those you can actually buy.

For previously reviewed Mac systems, the summaries reference the issue date and page number of the article. In some cases, such as faster versions of existing Macs, there is no full review and thus no cross-reference. New systems are indicated in the benchmark by the ► icon.

Prices from Apple, Motorola, and Umax are company-estimated street prices. APS, DayStar, Power Computing, and PowerTools sell direct. Unless otherwise noted, all pricing includes a keyboard and mouse, but not a monitor or modem.

For price comparisons, estimate spending about \$800 for a 17-inch monitor, \$175 for a modem, \$100 for an extended keyboard, \$50 for a mouse, \$400 for a 2GB hard drive, \$175 for 2MB of VRAM, and \$100 for 16MB of RAM.

OFFICE SYSTEM

EDITORS' CHOICE

★★★/6.5 **PowerCenter Pro 180** This affordable 180MHz Mac is superspeedy and has great features for all tasks, including an upgradable CPU and 3-D circuitry. It's this month's top pick for an office Macintosh, an ideal choice for midrange users. This configuration is upgraded from the base model, but is still

quite affordable. Subtract \$100 for the desktop version. Power Computing (512/388-6868): \$2244, 604e, 32MB RAM, 1MB cache, 4MB VRAM (4MB maximum), 2.0GB hard drive, 16× CD, 2 free drive bays, 3 PCI slots. Aug 97, p. 48

EDITORS' CHOICE

★★★/5.9 **Power Macintosh 7300/200** Apple's 7300/200 is a great buy for any office environment. It's only \$300 more than the less powerful Power Mac 7300/180 and it offers a nice performance boost. It's a strong performer that's competitively priced and easily expandable. Apple Computer (408/996-1010): \$2299, 604e, 32MB RAM, 256K cache, 2MB VRAM (4MB maximum), 2.0GB hard drive, 12× CD, 1 free bay, 3 PCI slots. May 97, p. 100

★★★/5.6 **SuperMac J700/180** Shopping for a new office Mac? Umax's price drops make it an even better purchase. Plus it has one more PCI slot, one more free drive bay, and more cache than the 7300/200. Umax Computer (510/226-6886): \$2099, 604e, 16MB RAM, 512K cache, 2MB VRAM (4MB maximum), 2.1GB hard drive, 8× CD, 2 free drive bays, 4 PCI slots. May 97, p. 100



Umax Computer's SuperMac C600x/280 will be right at home in any small office.

PORTABLE SYSTEM

EDITORS' CHOICE

★★★★/7.2 **PowerBook 3400c/240** It's almost twice as fast as a top-of-the-line Pentium portable yet costs just \$500 more. However, the 3400c isn't perfect: it's expensive, it doesn't support multiple monitors, and its CPU isn't upgradable. Apple Computer (408/996-1010): \$5999, 603e, 16MB RAM, 3.0GB hard drive, 12× CD, 12.1-inch active matrix LCD, 1 drive bay, 2 PC Card slots. May 97, p. 50

★★★/6.0 **PowerBook 1400cs/117** This midrange notebook has an optional CD-ROM drive and a large passive matrix LCD panel. It's more affordable and a better system than the old PowerBook 5300 series, but it's on its way out. Faster 133MHz and 166MHz configurations are available as well. Apple Computer (408/996-1010): \$2000, 603e, 12MB RAM, 750MB hard drive, optional 6× CD, 11.3-inch passive matrix LCD, 1 drive bay, 2 PC Card slots (\$3500 model 1400c/117 has active matrix LCD and 1.0GB hard drive). Jan 97, p. 58

SMALL-OFFICE/HOME-OFFICE SYSTEM

EDITORS' CHOICE

★★★/6.7 **StarMax 5000/300 MT** Motorola recently discontinued its StarMax 3000 and 4000 lines. Now the great performance and features of the 5000/300 are offered in other speeds and configurations. This 300MHz Mac is still an Editors' Choice for home and small office use. Motorola pumps top speed and features into an affordable computer. Its speed ties that of many 604e-based computers, and its Iomega Zip drive, 4GB hard drive, and 16× CD-ROM drive complement the nice feature set. Consultants and small businesses will enjoy this feature-rich tower. Motorola Computer Group (800/759-1107): \$2899, 603e, 32MB RAM, 512K cache, 4MB VRAM



Salvador Dalí would love DayStar's Genesis MP 800+, a graphics workstation masterpiece.

(8MB maximum), 4.3GB hard drive, 16× CD, 3 free drive bays, 5 PCI slots, Zip drive. Sep 97, p. 60

EDITORS' CHOICE

★★★/6.2 **PowerBase 240** It's slower than the StarMax 5000, but still has a great price/performance ratio. Its pro-level performance, strong feature selection, and greater expandability hold its place in the the SOHO category. Now offering a \$100 rebate. Power Computing (512/388-6868): \$1599, 603e, 16MB RAM, 256K cache, 2MB VRAM (4MB maximum), 2.0GB hard drive, 8× CD, 3 free drive bays, 3 PCI slots. May 97, p. 100

★★★/6.2 **SuperMac C600x/280** With 1MB of in-line cache, the C600 moves into the top class of 603e performers. Earns points for its upgradable CPU, but users will want more VRAM and PCI slots. Umax Computer (510/226-6886): \$2799, 603e, 32MB RAM, 1MB cache, 2MB VRAM (2MB maximum), 4GB hard drive, 12× CD, 4 free drive bays, 1 free PCI slot. Oct 97, p. 48

★★★/6.1 **Power Macintosh 6500/225** This decent SOHO alternative has cool features—even a Zip drive. But the 225 is *continues*

REAL PRODUCTS REAL RATINGS

Reviews you can trust: Unlike other publications, *Macworld* rates only final shipping products, not prototypes. What we review is what you can actually buy. Outstanding ★★★★★ = 9.0–10.0 Very Good ★★★★ = 7.0–8.9 Good ★★★ = 5.0–6.9 Flawed ★★ = 3.0–4.9 Unacceptable ★ = 0–2.9

Every Shipping Mac Tested and Rated

To help you make the right buying decision, *Macworld* rerated all shipping Macs according to our new SpeedMark and categorized systems in Professional, Consumer, and Portable categories. New scores have been adjusted proportionally to reflect anticipated technological developments for the following year. Longer bars are better. Core results are times as fast as an Apple Power Macintosh 7100 (7100 = 1.0). Only shipping systems are tested and rated.

Longer bars are better. Editors' Choice winners' names are in red. ▶ New. An Apple Power Macintosh 7100/80 has a SpeedMark score of 1.0.

	SpeedMark	Star Rating*
Professional Category		
Apple Computer		
Power Macintosh 7300/180	2.4	★★★/5.8
Power Macintosh 7300/200	2.6	★★★/5.9
Power Macintosh 8600/200	2.7	★★★/6.5
Power Macintosh 9600/200	3.1	★★★/6.7
Power Macintosh 9600/200MP	2.9	★★★/6.2
Power Macintosh 9600/233	3.3	★★★/6.6
APS Technologies		
MPower 604e200	2.6	★★★/5.9
DayStar Digital		
Genesis MP 800+	3.1	★★★/5.9
Genesis MP 900+	3.2	★★★/5.7
Power Computing		
Power Center Pro 180	2.9	★★★/6.5
Power Center Pro 210	3.2	★★★/6.4
PowerTower Pro 225	3.4	★★★/6.4
PowerTowerPro 250	3.6	★★★/6.2
PowerTools		
▶ Infiniti 4200GT Smart	2.7	★★★/6.2
Umax Computer		
SuperMac J700/180	2.7	★★★/5.6
SuperMac S900/180	2.9	★★★/6.5
SuperMac S900/180DP	2.7	★★★/6.4
SuperMac S900/200	3.1	★★★/6.6
SuperMac S900/200DP	2.8	★★★/6.1
SuperMac S900/225	3.1	★★★/6.4
SuperMac S900/233	3.2	★★★/6.5
SuperMac S900/250	3.5	★★★/6.3
SuperMac S900/250DP	3.3	★★★/6.2

Consumer Category

Apple Computer		
Power Macintosh 4400/200	1.9	★★★/5.5
Power Macintosh 5500/225*	2.1	★★★/6.7
Power Macintosh 6500/225	2.1	★★★/6.1

EDUCATION SYSTEM

EDITORS' CHOICE

★★★/6.7 **Power Macintosh 5500/225** It's a shame that this all-in-one Mac is available only to schools. The 5500/225 boosts performance in the education market by offering rich features and a fast CPU at a reasonable price. Same case, convenience, and price as the old 5400's, but with more power and 3-D capabilities. Apple Computer (408/996-1010): \$1999

(only sold to schools), 603e, 16MB RAM, 256K cache, 2MB VRAM (2MB maximum), 2.0GB hard drive, 12× CD, no free drive bays, no PCI slots; Ethernet card, internal stereo speakers, monitor included. Aug 97, p. 52

EDITORS' CHOICE

★★★/5.9 **PowerBase 200** It's fast, cheap, and expandable, with 3-D video acceleration. This 200MHz Macintosh is Power Computing's base processor speed for the PowerBase line. A great buy for cash-strapped schools and students. Take off \$100 if you buy this summer. Power Computing (512/388-6868): \$1399, 603e, 16MB RAM, 256K cache, 2MB VRAM (4MB maximum), 2.0GB hard drive, 8× CD, 3 free drive bays, 3 PCI slots. May 97, p. 100

	SpeedMark	Star Rating*
Power Macintosh 6500/250		
Power Macintosh 6500/275	2.4	★★★/5.9
Power Macintosh 6500/300	2.5	★★★/5.9
APS Technologies		
MPower 603e180	1.3	★★★/5.0
MPower 603e200	1.7	★★★/5.2
MPower 603e240	1.9	★★★/5.7
Motorola Computer Group		
StarMax 5000/300 MT	2.7	★★★/6.7
Power Computing		
PowerBase 180	1.7	★★★/6.1
PowerBase 200	1.8	★★★/5.9
PowerBase 240	1.9	★★★/6.2
PowerTools		
▶ Infiniti 3200GT Smart Bundle	2.0	★★★/5.8
Umax Computer		
SuperMac C500/180	1.7	★★★/5.2
SuperMac C600/200	1.8	★★★/5.1
SuperMac C600/240	1.9	★★★/5.0
▶ SuperMac C600x/240	2.4	★★★/6.0
▶ SuperMac C600x/280	2.5	★★★/6.2

Portable Category

Apple Computer		
PowerBook 1400c/117***	0.8	★★★/6.0
PowerBook 1400cs/117***	0.8	★★★/6.0
PowerBook 1400c/133	1.0	★★★/6.1
PowerBook 3400c/180	1.7	★★★★/7.0
PowerBook 3400c/200	1.8	★★★★/7.1
PowerBook 3400c/240	2.0	★★★★/7.2

*Based on features, implementation, innovation, performance, reliability, ease of use, and value. (See Star Ratings section for full explanation.) **Available only to educational institutions. ***Had less than 32MB of RAM, so some tests were conducted with virtual memory, which slows performance.

IMAGE-EDITING AND 3-D GRAPHICS SYSTEM

EDITORS' CHOICE

★★★/6.4 **PowerTower Pro 225** This expandable tower is ideal for all-around image editing. A multiprocessor-based Mac is faster for some key operations, but the 225 is faster and cheaper. Plus Power Computing's summer sale offers 128MB of RAM for a bargain price. Power Computing (512/388-6868): \$3594, 604e, 32MB RAM, 1MB cache, 8MB VRAM (8MB maximum), 2.0GB hard drive, 16× CD, 6 free drive bays, 6 PCI slots. Jun 97, p. 108

EDITORS' CHOICE

★★★/5.9 **Genesis MP 800+** The ultimate Mac system is a new Editors'

Choice. It speeds through programs such as Adobe Photoshop and leaves plenty of room for upgrades. DayStar Digital (770/967-2077): \$6499, 604e, 32MB RAM, 512K cache, 4MB VRAM (4MB maximum), 2.0GB hard drive, 16× CD, 7 free drive bays, 6 PCI slots. Jun 97, p. 108

PUBLISHING AND DESIGN SYSTEM

EDITORS' CHOICE

★★★/6.4 **PowerCenter Pro 210** Power Computing is redefining affordable with the PowerCenter Pro 210. Recent price cuts make this Mac an even better deal. It costs less than high-end Macs with similar specifications, but it's a bit slower. Order this summer, you get 64MB of RAM free.

Power Computing (512/388-6868): \$2195, 604e, 32MB RAM, 1MB cache, 4MB VRAM (4MB maximum), 2.0GB hard drive, 16X CD, 2 free drive bays, 3 PCI slots. Aug 97, p. 48

EDITORS' CHOICE


★★★/6.4 **PowerTower Pro 225** The low price, high overall performance, and plush feature set make this tower a great purchase for publishing pros. It's already at a superlow price, but if you buy this summer, Power Computing will throw in a free 128MB RAM upgrade. Power Computing (512/388-6868): \$3594, 604e, 32MB RAM, 1MB cache, 8MB VRAM (8MB maximum), 2.0GB hard drive, 16X CD, 6 free drive bays, 6 PCI slots. Jun 97, p. 108

★★★/6.4 **SuperMac S900/225** Umax shaved a few bucks off the S900/225, making it a better value for publishing and designing professionals. It's nearly as fast as the PowerTower Pro 225, but with fewer free bays. It's still a solid choice if you're shopping for an expandable, fast Macintosh. Umax Computer (510/226-6886): \$3499, 604e, 32MB RAM, 512K cache, 8MB VRAM (8MB maximum), 2.1GB hard drive, 8X CD, 4 free drive bays, 6 PCI slots. Jun 97, p. 108

MULTIMEDIA AND VIDEO-CREATION SYSTEM

EDITORS' CHOICE

★★★/5.9 **Genesis MP 800+** This expandable Mac speeds through multi-processor (MP)-enabled programs such as Adobe Premiere. Its four 604e/200MHz CPUs can handle complex video creation, and there's plenty of room for upgrades, with 12 RAM slots and seven drive bays. DayStar Digital (770/967-2077): \$6499, 604e, 32MB RAM, 512K cache, 4MB VRAM (4MB maximum), 2.0GB hard drive, 16X CD, 7 free drive bays, 6 PCI slots. Jun 97, p. 108

★★★/6.5 **Power Macintosh 8600/200** A clever, unique case takes the pain out of upgrading the Power Mac 8600/200. Green-colored handles, levers, and buttons make it easy to get inside the box. Novice video creators will enjoy the cool built-in video, but serious multimedia gurus may be disappointed with the minimal three PCI slots. Apple Computer (408/996-1010): \$2999, 604e, 32MB RAM, 256K cache, 2MB VRAM (4MB maximum), 2.0GB hard drive, 12X CD, 1 free drive bay, Ethernet card, built-in video. Aug 97, p. 50 

MOTOROLA UPDATES STARMAX LINE

Drops slower systems, consolidates products

Moving from yesterday's speed demon to today's hot chip, some vendors, including Motorola Computer Corporation, have stopped selling systems based on the 180MHz and 200MHz PowerPC 603e chips. Motorola consolidated its remaining systems into the StarMax 5000 line. This new series incorporates systems from the StarMax 3000 and 4000 lines with additional memory, faster bus speeds, a larger peripherals selection, and slightly higher prices.

The StarMax 5000 line now has four 603e-based systems—the 5000/225, 5000/250, 5000/275, and the previously announced 5000/300. All of these systems include an increased 50MHz CPU bus speed, thanks to the Tanzania II motherboard design; larger, 2.5GB and 4.3GB hard drives; preinstalled ATI Rage II+/3-D on-board video; a 56K modem or 10BaseT Ethernet connection; a 16X SCSI CD-ROM drive; and a minimum 2MB of VRAM and up to 1MB of secondary cache.

Motorola's StarMax 4000/200 MT and 4000/200 DT systems migrated to the 5000 line as well—reappearing as the StarMax 5500/200. This system offers a faster, 50MHz bus speed; a larger, 2.5GB hard drive; 64MB of RAM (upgradable to 160MB); an Ethernet hookup; and an Iomega Zip drive.

In addition, Power Computing and APS Technologies have discontinued selling their 180MHz 603e-based systems.

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MACWORLD LAB TEST

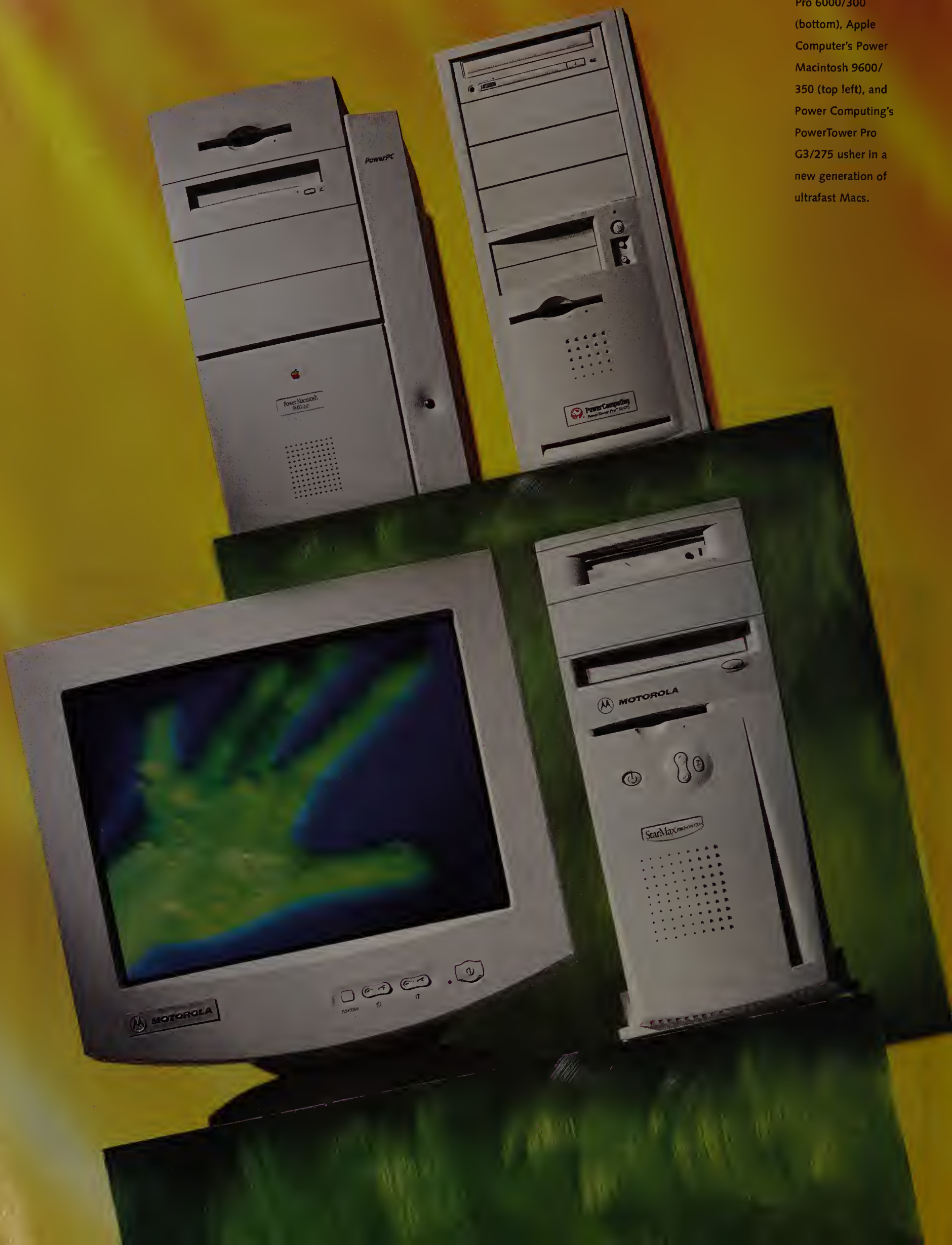
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Macworld
THE ESSENTIAL MACINTOSH® RESOURCE

Trailblazers
Motorola's StarMax
Pro 6000/300
(bottom), Apple
Computer's Power
Macintosh 9600/
350 (top left), and
Power Computing's
PowerTower Pro
G3/275 usher in a
new generation of
ultrafast Macs.



NEW-GENERATION SYSTEMS
SHATTER **SPEED** RECORDS

Upstart Macs



BRACE YOURSELF. YOU'RE ABOUT TO GET A look at the future of the Macintosh, and the future is *fast*. The future is also *now*. The first systems based on the Common Hardware Reference Platform (CHRP) and the newest PowerPC CPUs are about to arrive, and according to Macworld Lab tests of prototype versions, these systems are harbingers of what promises to be a blazing new era for Macintosh computing.

A range of new technologies—faster CPUs, new cache architectures, and CHRP—will move from the drawing board to the production line with the release of these new-generation systems. We tested prototypes of the first PowerPC 750 systems, the first 350MHz Mac, and the first CHRP computers. Among our discoveries was the fastest system

BY TOVA FLIEGEL

yet—Motorola Computer Group's (www.mot.com/starmax/) StarMax Pro 6000/300, which is the first CHRP implementation.

We applaud Motorola for making CHRP a reality. The StarMax Pro 6000 is a high-end line based on the company's 66MHz-system-bus CHRP motherboard, code-named Cobra. It's also one of the first Macs to use the PowerPC 750 CPU, also known as Arthur and G3. (Expect a slew of CHRP and PowerPC 750 systems from other vendors later this year.)

In Macworld Lab tests, a prototype 300MHz StarMax Pro 6000 outran its closest competitor by nearly 10 percent overall. In hands-on testing, the system ripped through Adobe Photoshop filters—performing some operations on a 17MB test file so quickly that if we looked away from the screen even briefly, the operation was complete when we looked back.

Motorola is not alone in pushing the Macintosh to a new level. We also tested Power Computing's (www.powercc.com) PowerTower Pro G3/275, which uses the PowerPC 750, and Apple Computer's (www.apple.com) newest Power Macintosh 9600 and 8600 models, which use the newly redesigned PowerPC 604e and include the first 350MHz implementation.

Until we tested the StarMax Pro 6000/300, the PowerTower Pro G3/275 had held top honors as fastest Macintosh (see "275MHz Mac Powerhouse," *Macworld*, September 1997).

It isn't just sheer CPU speed that sets these Macs apart. Systems vendors are now *balancing* the design of their machines.

That is, vendors aren't simply increasing the megahertz rating to improve performance; they are also making components work together to bring systems closer to their full potential.

In each of these Macs, various PowerPC CPU implementations, new caching schemes, and (in the Motorola systems) CHRP system-bus speeds round out performance. When you buy a system, you'll need to choose among these technologies, so let's look at them in more detail.

Faster PowerPC CPUs

All the systems we tested use a new generation of PowerPC CPUs. Both the PowerPC 750 and the new 604e (code-named Mach 5) were engineered to use less power—an amazingly low 5 watts at 250MHz speeds—than the older 604e. In 200MHz versions, the older 604e uses

19.5w—nearly four times the power consumption of the 750. (In comparison, a 266MHz Pentium II uses 38w, and a 200MHz MMX Pentium uses 15.7w.)

The new CPUs' smaller die size is one of the reasons they consume less power and also emit less heat than their predecessors. The new 604e has a 47-millimeter-square footprint; the PowerPC 750 is 67 millimeters square; and the older 604e's are 148 millimeters square.

The PowerPC 750 is optimized for integer calculations—the kinds of operations performed by most business and graphics applications. In contrast, the PowerPC 604e is better for floating-point operations, the types of operations performed by scientific and engineering applications, for example.

Motorola's RISC Microprocessor Division says the PowerPC 750 will be used

in most desktop systems, whereas the 604e will become the CPU of choice for workstations and multiprocessing systems.

The Principles of Cache

A common speed-boosting technique used in all the new-generation systems is an advanced cache architecture.

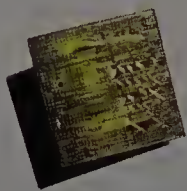
You probably know that cache improves performance and that more cache is better, but if you've been confused about what cache is, here's a simple explanation. Cache is a memory subsystem that stores frequently used RAM data for fast access by the CPU.

So if, for example, you ask your spreadsheet to perform a calculation, the software works through the CPU to request data or another piece of code from RAM. The cache intercepts the request on its way to RAM and, if it's the first time the

Mac Systems Milestones: Toward the Next Generation

1993

THE POWERPC TRANSITION BEGINS



April

- Motorola ships 50MHz and 66MHz 601's, first of the PowerPC family.

September

- Developers, including Adobe and Aldus, show betas of PowerPC-native applications. Most native programs start shipping in spring 1994.

October

- IBM releases 50MHz, 66MHz, and 80MHz 601's, announces 80MHz 604.

November

- Apple licenses PowerPC ROMs to DayStar Digital to create first PowerPC upgrade cards. DayStar later becomes the key maker of Mac multiprocessing systems.

1994

MOVING TO A MORE OPEN MAC

January

- Apple shows first PowerPC product, a 66MHz 601 upgrade card.

February

- Apple first discusses Copland.



March

- Apple unveils first 601 systems: Power Mac 6100/60, 7100/66, and 8100/80.

June

- Apple unveils System 7.5.

September

- Apple licenses Mac OS to Radius and Power Computing.

November–December

- IBM and Motorola ship 66MHz and 80MHz 603's. IBM ships 100MHz 604.
- Apple, IBM, and Motorola agree to develop a PowerPC standard, PowerPC Reference Platform (PReP). It later evolves into Common Hardware Reference Platform (CHRP).

1995

PCI GAINS A FOOTHOLD; CLONES EMERGE

February

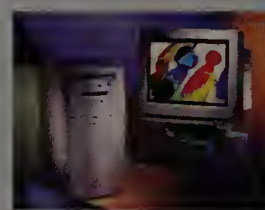
- IBM and Motorola announce 100MHz 603e with twice the 603's memory cache; it ships in fall.

April

- IBM ships 120MHz 601.

May

- Power Computing ships first Mac clones.



June

- Apple introduces first PCI-based Mac: \$5000 Power Mac 9500/120 uses first motherboard with 50MHz system bus (Tsunami). Previous maximum was 40MHz.
- IBM and Motorola introduce 120MHz and 133MHz 604 samples.

November

- Apple, IBM, and Motorola release CHRP specs, intended to let the Mac run major OSs except Windows 95 and to replace then-current Mac hardware design.

data has been accessed, fetches the data from RAM. Upon retrieving the data, the cache stores a copy of it so that when the request is made a second time, the cache answers the request much more quickly.

There are two kinds of cache: internal (on the CPU itself), called Level 1 or L1, and external (on the motherboard or CPU card), called Level 2 or L2. (There's another kind of external cache, too, called Level 3 or L3; however, at this time L3 caches are not sizable enough to provide significant benefits.) Because it's part of the CPU, L1 cache is faster and smaller than L2.

All the new 604e's and the PowerPC 750 include 64K of L1 cache: a 32K data cache and 32K instruction cache—double the 603e's.

L2 acts as a secondary memory subsystem. Until now, most Macs have used 256K to 512K of L2 cache, although

Power Computing has offered 1MB of cache for about a year on its high-end systems, and other vendors are starting to offer it as well.

New, Improved Cache

All the Macs in this article use 512K or 1MB of L2 cache, automatically giving them a performance boost over older machines. But it's not the standard L2 cache that Macs have offered for years.

The next-generation Macs increase the speed of L2 cache by using a high-speed cache connection between the CPU and the cache, rather than using the slower system-bus connection found in previous Macs. There are two kinds of fast cache buses: backside and in-line.

Backside Cache The PowerPC 750 takes advantage of *backside cache*, which uses a separate, high-speed cache bus spe-

cially reserved for CPU-to-cache (and cache-to-CPU) communications. The PowerPC 750's backside cache communicates with the CPU in 1:1, 2:3, 1:2, or 2:5 ratios. So, for example, a 300MHz PowerPC 750 can communicate with the cache using a 300MHz, 200MHz, 150MHz, or 120MHz cache bus. Compare that with the typical 40MHz to 50MHz system-bus speeds that previous Macs' caches use to communicate with the CPU.

As CPU speeds increase, it becomes more important for cache-bus speeds to increase: you lose the advantage of a very fast CPU if it sits idle because of heavy traffic on a slow bus.

In-line Cache The 604e (and 603e) lacks connectors for a backside cache, but systems designers can nonetheless increase cache speed through an *in-line* cache, which, like backside cache, uses a

1996

POWERPC BREAKS THE 200MHZ MARK

February

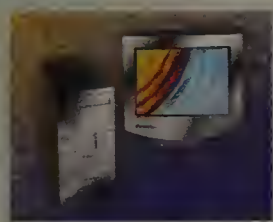
- Apple licenses Mac OS to Motorola, the first licensee with authority to sublicense.

April

- IBM ships 166MHz and 180MHz 604's.

May-July

- IBM and Motorola ship 166MHz, 180MHz, and 200MHz 603e's and 604e's.
- Apple allows IBM to sublicense the Mac OS.



August

- Motorola demos Viper CHRP system.
- IBM demos its CHRP design, Long Trail.
- Apple kills Copland.
- Apple, IBM, and Motorola announce G3 (PowerPC 750) and G4 series.

December

- IBM stops developing Windows NT for PowerPC (Motorola follows), making the Mac OS the only major OS to run on CHRP.
- Apple buys Next.

1997

CHRP ARRIVES: A NEW GENERATION IS BORN

January

- Apple ships System 7.6.

April

- Motorola introduces 300MHz 603e.

June

- Motorola launches 250MHz next-generation 604e (Mach 5). Mach 5 hits 350MHz by year's end.



July

- Apple ships Mac OS 8 with PowerPC-native Finder. Mac OS 8 with CHRP support soon follows.

August-October

- Motorola ships PowerPC 750.
- Motorola ships first CHRP systems, raising bus speeds to 66MHz. Apple ships Mach 5-based Power Macs.

1998 and Beyond

GLIMMERS OF THE FUTURE



By year's end

- Expect PowerPC 750 speeds to exceed 350MHz.
- Expect CHRP system-bus speeds to hit 83MHz by year's end and 100MHz soon after. CHRP system costs should drop.

Early 1999

- Expect G4 systems to debut at 400MHz, and to reach 500MHz-plus by year's end.

New-Generation Macs Feature Faster CPUs and Cache

Company	Product	Price ^B	SPEED-RELATED FEATURES							MEMORY		
			CPU Type			CPU Speed	Cache Type	Cache Amount	System Bus Speed	RAM		Total RAM Slots
			750	604e	603e					64MB	32MB	
Apple Computer (408/996-1010)	Power Macintosh 9600/350	\$5400		●		350MHz	in-line	1MB	50MHz	●		12
	Power Macintosh 9600/300	\$4600		●		300MHz	in-line	1MB	50MHz	●		12
	Power Macintosh 8600/300	\$3700		●		300MHz	in-line	1MB	50MHz		●	12
Motorola Computer Group (800/759-1107)	StarMax Pro 6000/300	NA	●			300MHz	backside	1MB	66MHz	●		4
	StarMax Pro 6000/266 XL	\$5500	●			266MHz	backside	512K ^D	66MHz	●		4
	StarMax Pro 6000/266	\$4600	●			266MHz	backside	512K ^D	66MHz	●		4
	StarMax Pro 6000/233	\$3900	●			233MHz	backside	512K ^D	66MHz		●	4
Power Computing (512/388-6868)	PowerTower Pro G3/275	\$4795	●			275MHz	backside	1MB	50MHz	●		8
	PowerTower Pro G3/250	\$4295	●			250MHz	backside	1MB	50MHz	●		8
	PowerTower Pro G3/250 Core	\$3695	●			250MHz	backside	1MB	50MHz		●	8

● = yes; NA = not available. ^A All include one ADB, two serial, one external SCSI-1, two 16-bit stereo I/O, and one Mac video port. ^B All prices are company estimates, except for those from Power Computing.

high-speed connector to the CPU.

Unlike with backside cache, the speed of in-line cache is limited by its connection to the main system bus. In-line cache technology currently can only double the cache-bus speed, bringing it to 100MHz from the 50MHz maximum system-bus speed for most Macs. Thus, for example, with a 300MHz PowerPC 604e, the top bus speed of in-line cache is 100MHz, which makes the CPU wait longer for cache data than a 300MHz PowerPC 750 would with a 300MHz or even 150MHz backside cache.

The Benefits of CHRP

System-bus speed is important for the same reason cache-bus speed is: with a slow system bus, a fast CPU is kept waiting until the bus finishes processing data.

CHRP will initially provide a 66MHz bus speed, a 32 percent jump over the previous 50MHz maximum. CHRP bus speeds will hit 83MHz by the end of next year, and Tatung RISC Systems International (www.tatung.com.tw) plans to release to foreign markets this fall a CHRP system using a 75MHz bus.

Nearly three years in the works, CHRP emphasizes industry-standard parts and corresponding technologies available from multiple suppliers (see the sidebar, "Becoming More 'PC'"). For example, the CHRP motherboard has an IDE port to connect to storage devices and a PS/2 port for input devices. Another technology, FireWire, which provides 200-Mbps input/output between Macs and external devices such as printers, is currently sup-

ported through PCI slots. CHRP Systems will eventually include FireWire ports directly on the motherboard.

The PowerPC 750 together with the adoption of CHRP should bring the cost of systems down. Given the lower cost of system parts and the fact that the PowerPC 750 costs less than the 604e and Intel's Pentium CPUs, there soon should be no reason for Macs to be more expensive than PCs. Even if Apple's OS licensing fees exceed Microsoft's by \$150 to \$200, as it appears they will, the lower cost of the PowerPC 750 (an estimated \$400 to \$500) versus the cost of Intel's next-generation Pentium, called Klamath (an estimated \$700 to \$800), should more than make up the difference.

Let's look at how these technologies manifest themselves in the new generation of Macintoshes.

Motorola Debuts CHRP

Motorola has combined the most new technologies in its new StarMax Pro 6000 systems, resulting in the fastest Mac performance ever. Motorola is using CHRP architecture, the PowerPC 750, and a backside cache.

The StarMax Pro 6000 marks Motorola's impressive entrance into the pinnacles of the high end. The 233MHz and 266MHz versions of this Mac include 512K of L2 backside cache using 1:2 cache-to-CPU communications, so the 6000/233 uses a 116MHz cache bus, and the 6000/266 and 6000/266XL use 133MHz cache buses. They also include 1MB of L3 cache, but Motorola engineers

estimate that L3 cache sizes of 8MB will be needed to make a real difference.

Our speed leader, the StarMax Pro 6000/300, uses a full 1MB of L2 cache in a cache-to-CPU ratio of 2:3 for a 200MHz cache bus. That combined with the CPU's faster (300MHz) clock rate makes for a piece of artful engineering that stakes out a clear performance lead over competitors (see the benchmark, "A New Wave of Speedsters Arrives").

Though the units we tested were prototypes based on a new technology, they appeared stable. We did experience two system crashes: one when Photoshop was loading and the other while copying a large file from another machine connected through a Farallon EtherWave transceiver. Neither crash was reproducible.

The 233MHz StarMax Pro 6000 models will ship with 32MB of RAM, expandable to 1GB of EDO memory; the 266MHz and 300MHz models with 64MB, also expandable to 1GB. Thanks to its CHRP architecture, the Pro 6000 line can also use up to 96MB of synchronous DRAM (SDRAM), a faster type of RAM becoming prevalent in the PC market.

Motorola is providing an Ultra SCSI card to which you can connect devices at up to 40 MBps, in addition to the Mac's standard 10-Mbps SCSI-2 connectors. A 100MB Zip drive is standard. For configurations, see the table, "New-Generation Macs Feature Faster CPUs and Cache."

Motorola plans to ship the 233MHz and 266MHz versions in late September; this plan, however, is contingent on Apple's delivery of the Mac OS 8 ROMs

VIDEO DISPLAY			STORAGE							EXPANSION ^A					COMMUNICATIONS		
VRAM (std/max)	On-board Circuitry ^C	3-D Circuitry	Free Bays	Hard Drive		CD-ROM Drive			Zip Drive	Case	Free PCI Slots	Internal Bus				Modem	Ethernet
				2.0GB	4.0GB	24X	16X	12X				Ultra SCSI	SCSI-2	SCSI-1	EIDE		
8MB/8MB			2		●	●			●	tower	5		●				●
8MB/8MB			2		●	●			●	tower	5		●				●
2MB/4MB	●		2		●	●			●	tower	3		●				●
8MB/8MB			2		●	●			●	tower	3	●		●	●		●
8MB/8MB			2		●	●			●	tower	3	●		●	●		●
4MB/8MB		●	2	●		●			●	tower	3	●		●	●		●
4MB/8MB		●	2	●		●			●	tower	3	●		●	●		●
8MB/8MB			6		●	●			option	tower	4	●	●				●
8MB/8MB			6		●	●			option	tower	4	●	●				●
2MB/4MB			6	●	●	●			option	tower	4	●	●				●

which are direct prices. Systems ship with Mac OS 8. ^C All systems without on-board video come with a PCI video card installed. ^D Also includes 1MB L3 cache.

(see "Inside the Next-Generation Macs," *News*, September 1997). The StarMax Pro 6000/300 will follow in late October.

Power Computing Pushes Limits

Power Computing's engineers are notorious for squeezing the most performance out of existing designs, and the PowerTower Pro G3 is no exception. This system takes the Tsunami motherboard found in Apple, Power Computing, and Umax Computer (www.supermac.com) systems and makes it zoom by using a

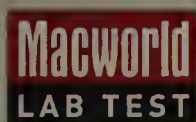
PowerPC 750 and a backside cache in a 1:1 ratio—the fastest implementation possible—creating a 275MHz cache bus.

Typically, to run 1:1 with the CPU, the cache chips must be extremely fast Static RAM (SRAM), which, at this time, is prohibitively expensive. Since Power Computing is not exactly known for lavish expenditures of this type, its engineers have likely either moved the cache even closer to the CPU or tweaked the connectors between the cache and CPU to provide the right electrical support for 1:1

CPU-to-cache communications.

Whatever the method for implementing a 1:1 cache bus, it works. With a lower megahertz rating, 275MHz, the PowerTower Pro G3 trounced the Power Macintosh 9600/350 and 9600/300 in Macworld Lab tests by about 18 percent and 27 percent, respectively.

The PowerTower Pro G3 also has a solid set of features: 64MB of RAM, choice of a 2GB 5400-rpm hard drive or a 4GB 7200-rpm drive, Ultra Wide SCSI, four free PCI slots, and an 8MB IXMicro



A New Wave of Speedsters Arrives

The latest wave of high-end Macs using the small-footprint PowerPC 604e (Mach 5) and PowerPC 750 (G3) CPUs significantly outperform their predecessors in our tests of prototype systems. Outrunning its closest competitor by nearly 10 percent, the top scorer is the CHRP-based StarMax Pro 6000/300, which uses a full 1MB of backside cache. Thanks to Motorola's pioneering CHRP design, the StarMax 6000, with its 66MHz system bus, also bests competitors based on 50MHz system buses, the Mac's pre-CHRP maximum bus speed.

■ Best overall performance. Longer bars are better. Bold indicates best result in a specific test. ► New. An Apple Power Macintosh 7100/80 has a SpeedMark score of 1.0.

		SpeedMark						
		CPU	FPU	Disk	Video	Star Rating		
► Motorola StarMax Pro 6000/300	5.6	6.2	5.4	3.9	9.8	not shipping		
► Power Computing PowerTower Pro G3/275	5.1	5.9	5.2	2.8	9.4	not shipping		
► Motorola StarMax 6000/266 XL	4.6	4.9	4.7	3.4	8.5	not shipping		
► Apple Power Macintosh 9600/350	4.3	4.7	4.7	2.6	7.7	not shipping		
► Apple Power Macintosh 9600/300	4.0	4.3	4.3	2.5	7.1	not shipping		
Power Computing PowerTower Pro 250	3.6	3.9	3.8	2.5	7.6	★★★/6.2		
► Apple Power Macintosh 8600/300	3.6	4.1	4.1	2.3	3.9	not shipping		
Apple Power Macintosh 9600/233	3.3	3.5	3.4	2.3	6.9	★★★/6.6		
Apple Power Macintosh 9600/200MP	2.9	3.0	2.8	2.1	5.9	★★★/6.2		
Apple Power Macintosh 8600/200	2.7	3.0	2.9	1.9	3.6	★★★/6.5		

Behind Our Tests

For detailed information on our systems benchmarks, see *Mac Superguide*, September 1997.—Macworld Lab testing supervised by Mark Hurlow

FOR MANY OF US, THE MACINTOSH is sacred: it's the more creative desktop tool, the anti-PC that we've known and loved for years. It would be heresy to say the Mac can benefit by using industry-standard (read *PC*) components. Well, it turns out these two things are not mutually exclusive. CHRP Macs are still 100 percent Macintosh, and they'll benefit users by including more

industry-standard components.

While many of these components are already implemented to varying degrees in some Mac systems, the adoption of CHRP should help the platform standardize on such components. Further, by using standard components, over time CHRP-based machines should cost systems makers less to manufacture, thus reducing Mac-system prices. CHRP motherboards will also broaden your ability to use PC peripherals, which typically cost

less than their Mac counterparts.

Here's a look at some of the components in Motorola's CHRP motherboard, code-named Cobra, that will enhance your Mac's compatibility with industry standards without diminishing its Mac-hood.

• **Zero Insertion Force (ZIF) Socket** This is where the PowerPC 750 CPU (not shown) with backside cache lives. Sockets of this type first came into in the Intel world and have been used by Umax since its C-series SuperMacs were first released. The ZIF socket will make CPU upgrades easier because all you have to do to disengage the CPU is lift a small lever. CPUs that are plugged into these sockets should be less expensive than CPUs packaged on daughtercards.

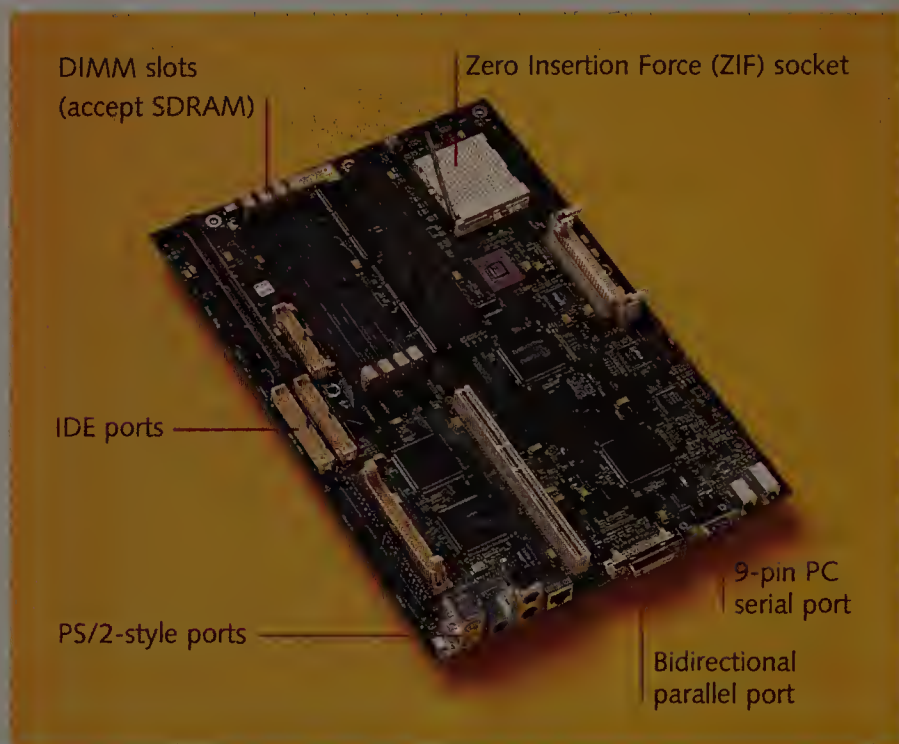
• **DIMM Slots** The Cobra motherboard includes four DIMM slots, which also accept synchronous DRAM. Becoming popular on the PC side, SDRAM is typically faster than the traditional EDO RAM used in most Macs, particularly in applications that require more sequential, as opposed to random, memory access. Such applications include Adobe Photoshop and CAD pro-

grams. On Motorola's Cobra, you can load up to 96MB of SDRAM and 1GB of EDO RAM.

• **IDE Ports** With Integrated Drive Electronics ports right on the motherboard, users should be able to connect their Macs to inexpensive hard drives. At press time, Apple was still building IDE support into the CHRP implementation of Mac OS 8; CHRP's IDE ports won't be usable until Apple completes this work.

• **PS/2-Style Ports, 9-Pin PC Serial Port** These ports are typically used for joysticks, mice, and keyboards. As long as vendors supply the appropriate Mac drivers, you should be able to take advantage of less-expensive PC peripherals.

• **Bidirectional Parallel Port** Used primarily to connect low-end, single-user printers, this style of port speeds printing because data travels in two directions using an 8-bit data path (versus the 1-bit data path most low-end Mac printers use). Its bidirectional capability means that the printer can more efficiently send notification if it's out of toner or paper. Motorola is including GDT's PowerPrint driver for this port.



TwinTurbo card with 2MB of VRAM on the 250 Core configuration. Power has upped prices by about \$300 from what *Macworld* first published in the September issue, so check the accompanying product table for updated information.

Apple Hits 350MHz

Apple has hinted for months about its new Power Mac 8600 and 9600 systems, code-named Kansas. On the basis of CPU ratings alone, these systems would appear to have the top performance, with a 350MHz 604e in one 9600 version. But Apple's systems actually are the laggards of the new generation, since they don't really add much to the two-year-old Tsunami architecture other than a faster 604e CPU and 1MB of in-line cache (which is slower than a 750's backside cache).

The result of the improving caching scheme is that a prototype of the top-of-the line Power Mac 9600/350 outper-

forms the older 9600/233 by about 30 percent—not a trivial difference. But at the same time, when compared with a slower-megahertz machine (the StarMax Pro 6000/300), the 9600/350's performance numbers illustrate the advantages of the backside cache, the PowerPC 750's integer optimization, and a 66MHz system bus. With all three of those architectural improvements, the StarMax Pro 6000/300 outran the Power Mac 9600/350 by about 30 percent in our tests—proof that clock speed alone doesn't make a system.

The updated 9600 and 8600 come with a Zip drive, a 4GB hard drive, and a 24x CD-ROM drive. The cache is now upgradable, and standard memory is 64MB for the 9600 and 32MB for the 8600, up from 32MB and 16MB, respectively. But the Power Mac 9600/350 will cost \$5400—pretty steep, especially compared with the prices of competitors who offer more advanced technologies.

The Last Word

Every few years something happens to change the entire course of the Macintosh platform. The release of the PowerPC 601 in 1993 was one such event; the introduction of the first clones in 1995 was another. (For more on the events that led the Mac to this momentous point, see the timeline, "Mac Systems Milestones.") The emergence of the first CHRP and PowerPC 750 systems is such another such turning point.

These new systems provide blazing speeds due largely to a more holistic design approach as well as higher CPU megahertz ratings.

The PowerPC 750 and CHRP also pave the way for an even faster long-term future since both offer headroom for even greater speeds. **m**

Senior associate editor TOVA FLIEGEL is all out of breath from covering systems for *Macworld*.

GIMME FIVE *f r e e*



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details on our free 3.2 gigabyte
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Once you get past the cute name and trendy packaging, the only thing Jaz® users have left is a thinner wallet. Good thing there's DynaMO® 640 removable storage from Fujitsu. DynaMO 640 is much more durable because it's magneto-optical (unlike Jaz). It lets you save your work on different media capacities ranging from 128MB to 640MB (unlike Jaz). You get free tech support (unlike Jaz). And it's less than half the cost of Jaz media*, with a 640MB cartridge going for only \$25. (Bye-bye Jaz.) There's also our No ExcusesSM policy: Our promise that in the unlikely event your drive fails within warranty period, you'll get a replacement drive in two business days. For more details, without the hustle, call, or visit our website.

FUJITSU

(800) 735-4510 www.fcpa.com

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Circle 202 on reader service card



BEST MAC WEB SITES

MACWORLD UNCOVERS THE WEB'S TOP RESOURCES

If you haven't visited any Macintosh-related sites on the World Wide Web recently, you're in for a surprise. Plenty of good, entertaining sites focus on the Mac; that's nothing new (see "The Best Mac Web Sites," *Macworld*, August 1996). The difference is that many of these sites have become more sophisticated—and even more useful—in the past year.

The proliferation of robust database tools, which make detailed information from a variety of sources easily accessible, is one reason why the Web has become an invaluable resource for Macintosh owners and users. Case in point: this spring, the American Computer Exchange added a database of stolen computers to its Web site, through which users can make their missing Mac's serial number available to thousands of law-enforcement agencies.

You'll find other signs that the Web is growing up.

BY HOW A R D B A L D W I N

Web-page graphics have noticeably improved, for one thing. I doubt the world was suddenly blessed with color coordination, so it must be that more Webmasters are relying on professional designers to create their Web sites. At the same time, more pages have elements that dance and move and wriggle, thanks to a multitude of snazzy Web-browser plug-ins.

For this year's salute to the best Mac-related sites on the Web, I've divided the winners into six categories. Each section focuses on the top sites that help you save money, get technical support, stay up-to-date on the latest Macintosh news, network with other Mac fans, learn about the latest technologies, and have a little fun. I've also included sites for checking out what Apple and the Mac licensees are up to (see the sidebar, "Mac Makers Online").

If you'd prefer to read this story online, visit Macworld Online, www.macworld.com. All the Web sites in this story have been linked for easy access.

Alpha-Beta Soup

The motto of the Macintosh News Network (www.macnn.com) is "the news . . . plain and simple," but it's also the best place to get your daily (yes, daily) fix of product assistance, including the progress of software in both alpha and beta versions. This is also a great source of information about free offers, sales, and product bundles. Its extensive archive lets you do case-sensitive and



Boolean searches going back to December 1996.

Talking Trash

As you reach the limits of your hard drive's capacity, you may wonder what you can safely trash. Find out at the Mac Pruning Pages (www.AmbrosiaSW.com/DEF/), "the indispensable guide to what's dispensable on your Mac." The detailed descriptions of control panels, extensions, and groups of OS items help you determine what you need and



what you don't.

The Conflict List

Conflict is good in the theater, but it's bad in a Macintosh. When conflicts arise, try resolving them with a visit to the Complete Conflict Compendium Web page (www.quillserv.com/www/c3/c3.html). The site could hardly be



uglier, but it tracks potential conflicts between application extensions

so you can report them correctly to your Mac vendor's tech-support line or figure out how to fix them yourself. Caveat: the information is updated irregularly at best. You can browse by software title or by recent entries, which list the conflicting applications. Each entry cites a date of submission, so you can see how recent it is.

The Newest Version

Make sure you have the most up-to-date version of your software by pointing your browser to the Version Tracker Web site (www.versiontracker.com). The latest version numbers of software programs, drivers, and utilities are listed in order by the day the developers posted them; click on the version number for a link to the appropriate Web site for downloading.



Tech-Support Library

Got a problem? Then head over to Ted Landau's MacFixit Web page (www.macfixit.com) for the solution, whether it relates to system software, MPEG, or



PowerBooks. Besides daily updates, the

site has an archive (arranged by month), a library of freeware and shareware, and reports categorized by topic.

JOIN THE CLUB: Mac Community Outreach

Start Here

Though not particularly attractive, four Web sites provide remarkably comprehensive sets of links to a ton of information about the Mac, including vendors, periodicals, newsgroups, software applications, utilities, shareware, books, and the latest news. Start your Mac Web-site browsing at The Ultimate Macintosh (www.freepress.com/myee/umac.html), Macintosh Web Resources from "The Rest of Us" (www.ralenz.com/old/mac/net/net-rest-of-us.html), The Well Connected Mac (www.macfaq.com), or Everything Macintosh (www.everythingmac.com).



Devotees' Delight

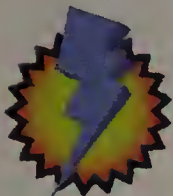
The Happy Mac Web site (macexpert.com/HappyMac/) gives us something we could all use more of: good news about the Mac. Like many sites, it offers lots of software for downloading. It also has links to some early screen shots of Rhapsody; new Apple ad campaigns; and—get this—a link to information on Gus, an Apple IIgs emulation program for the Power Mac.

Find the Users

If you want to go to the pumping heart of Macintosh passion, there's no better destination than a user group meeting. The User Group Connection's Web site (www.ugconnection.org) lets you find local user groups and their Web sites, tells you how to start your own user group, and gives you links to vendors who are offering special marketing deals to members. (Oh, and PC user groups are here, too.)

PowerBook Updates

Want to know Apple's plans for the PowerBook? Turn to O'Grady's PowerPage (www.ogradys.com/default.html), where Jason D. O'Grady provides the latest news on the portable Macs, as well as a PowerBook FAQ department, sneak previews of upcoming



models, and a fun (but not terribly useful) list of celebrities who use PowerBooks.

You can also post an ad to sell your PowerBook.

Tips and Rumors

Mac OS Rumors (rumors.netexpress.net) is a one-stop shop for good tech tips, software updates, and a side dish of Mac OS gossip. Say you've been frustrated by the slow downloads at Apple's site when trying to get the 7.6.1 L2 Cache Fix extension for your Alchemy-based motherboard. Mac OS Rumors advises you to download the fix from Power Computing's servers—they're faster. We even found information on Mac OS 8.1 weeks before Mac OS 8 was announced.



Immodesty Prevails

And, of course, our favorite. I might be a wee bit partial, but in this case it's justified: Macworld Online (www.macworld.com) is simply one of the best sources on the Web for breaking news regarding Apple and the Mac. The magazine's news department posts stories daily to keep readers up-to-date. Also, the searchable archive beats



storing back issues in your garage, and there are lots of downloadable shareware programs.

News Junkies' Joy

More than any other site, Webintosh (www.webintosh.com) resembles the front page of a traditional newsmagazine, with news, reviews, first looks, opinion pieces, and features, all relating to Macintosh systems, software, and peripherals. Best of all, it's updated almost hourly.



Ride the Curl

MacSurfer's Headline News (www.macsurfer.com/news/) is for serious news junkies. You'll find links to 77 newsy Apple- and Mac-specific Web sites, along with sites offering the latest scoop on technology (such as CyberTimes Index) and general-interest news coverage (including the home pages of Macworld, Reuters, Fox News, the Associated Press, and the Boston Globe). Consider this your online newsroom. Tip: scroll down its lead page for a hilarious masthead, which



includes a bomb squad and fishing crew.

GET A LIFE: Mac Sites Just for Fun

Humor Mongering

Steve Tannehill's Power Macintosh Resource Page (www.powermacintosh.com/pmr/macfun.shtml) dispenses Apple-related anecdotes, humor, and jokes. Sample: the Top Ten Macintosh Summer Olympic Events include the 15-meter Power Mac toss, the Open Transport configuration pentathlon, the Netscape 2.0 memory-requirements high jump, and the 100-meter freestyle Apple executive shuffle.

Easter Eggs

Some people just have too much time on their hands. I would guess that applies to Daniel Fanton, who's compiled the Apple Easter Egg Web Page (members.aol.com/ixist/apple.html), a compilation of the "secrets stuffed inside of your Macintosh or Newton by Apple programmers and engineers." Here's an example: hold down the option key when getting info on the AppleVision setup software (which comes with the AppleVision 1710 AV Display). Instead of a monitor icon, you'll see a hammerhead shark playing a tuba. Why? The code name for Apple's 1710AV monitor was Hammerhead and the code name for the 1710AV display was Sousa (go figure).



Bigotry at Its Best

Only evangelist Guy Kawasaki could be this brash and bigoted and get away with it. But it's fun: Why Macintosh? (www2.apple.com/whymac/) lists, among other things, pro-Mac propaganda, including a list of the 1899 hardware and software products that are available only for the Mac. It also tells how you can join Kawasaki's Internet mailing list and blast journalists who don't understand Apple.

Lost and Found

The American Computer Exchange posts prices of used Macs and PCs (www.amcoex.com). When it's time to buy or sell a used Mac, you can download its handy used-Mac price calculator. More important, it's recently added a valuable public service: a database of stolen-computer serial numbers. You can go online and add your missing Mac's number to the database. Ideally, when a law-enforcement agency recovers a stolen computer, it will access the database and return the computer to its rightful owner. You can register any computer peripheral with a serial number as well.

RAM Jam

If you want to get the best price for memory, log on to the Mac Resource Page's RAMWatch (www.macresource.pair.com/mrp/ramwatch.shtml). Ten memory dealers pay a monthly fee to participate in this Mac-specific page, listing prices for 72-pin SIMMs, 168-pin DIMMs, 3.3V EDO DIMMs, PowerBook memory, VRAM, and L2 cache. The prices listed have been updated within the last seven days, and the differences between them can be substantial—they can vary by about \$1 per megabyte.



Easy Shopping

Imagine being able to comparison-shop across the breadth of North America from your Mac. ComputerESP (uvision.com) tracks prices from major computer stores in the United States and Canada and updates more than 80,000 prices on computers, software, memory, processors, and multimedia peripherals a day. And that's just the hardware. There are also 18 categories of software, along with sources for training and computer supplies. On a recent visit, I found 27 retailers selling Microtek's ScanMaker 35T, with prices anywhere from \$700.48 to \$857.42.



Best of all, for each retailer the site gives you the location, the phone number, and the product's price and availability, plus a link to the retailer's Web page. For savvy consumers, Web sites don't get much better than this.

Shareware Galore

Imagine a cyberspace flea market, and you've got Todd Frazier's amazing Mac-centric shareware page (www.macshare.com), a treasure chest for games, graphics, Internet and productivity tools, system enhancements, utilities, and tips. Check out this site before you go shopping for a new software application; more often than not you'll find that a \$15 shareware program is all you need.



Shopping Cart

Ethics dictate that we tell you right off that the Web Shopper page (www.webshopper.com) is a division of our parent company, IDG. Still, it's a great place to do research before you shop.



What makes this site unique is that when you select a product

category, you'll be linked to a page that not only gives you information about that category, but also offers links to previously published reviews.

MAC MAKERS ONLINE

Apple Computer

(www.apple.com)

HIGHLIGHTS: You can download a QuickTime movie of the famous "1984" commercial; provides lots of pro-Mac ammunition for arguing with PC-using friends.

LOW POINT: Mixes information aimed at developers, consumers, and the press.

APS Technologies (www.apstech.com)

HIGHLIGHTS: You can join an electronic mailing list for unadvertised product closeouts; a database lets you enter specifications for your dream Macintosh and find out how much it costs.

LOW POINT: Unadvertised specials list only storage products.

DayStar Digital (www.daystar.com)

HIGHLIGHTS: Provides easy access to DayStar's FTP server for downloading company brochures, manuals, and price lists; maintains an up-to-date release schedule for 48 Mac applications optimized to use DayStar's multiprocessing API.

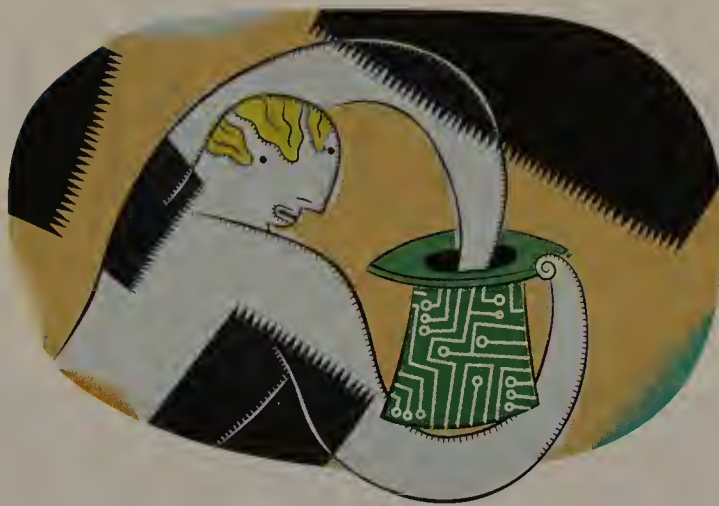
LOW POINT: Many dates on the release schedule are "TBA."

Motorola

(www.mot.com/starmax)

HIGHLIGHTS: Has compact comparison charts for each of Motorola's three StarMax lines; a database helps you locate retailers in your area.

LOW POINT: As with Apple's site, information for resellers and manufacturers is mixed in with consumer information.



VRML

The much-hyped virtual-reality technology for the Web gets the once-over at developer Richard Kapuaala's page, Kahuna's 3D Worlds (www.kahunanui.com/vrreview.htm). Check out the 3-D demos and get a solid explanation of what's behind VRML

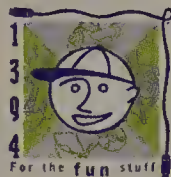


(Virtual Reality Modeling Language)

coding. Download the 3-D browser and try your hand at the virtual-reality games. You can also download LivePicture's RealSpace Viewer from here.

FireWire

No Apple technology has been more widely accepted into the technology marketplace than FireWire, already appearing on PCs and soon to appear on Macs. As the eventual successor to SCSI, it'll transfer data from peripherals such as scanners and digital cameras into your Macintosh at 400 megabits per second. Everything you want to know about the new interface is at the FireWire Web page (www.firewire.org), including links to the more than 100 companies that have committed to supporting it (including Apple, Intel, Kodak, and Microsoft).



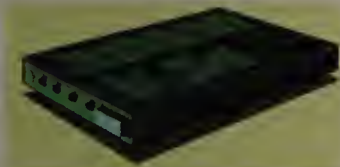
Java

Put down the coffee, because Esther Etherington's JavaMan page (www.javaman.com) will give you a buzz with its information and links to all things Java: job listings, bug lists, training, announcements, event listings, a conference area, a guide to consultants, and more. But why are there Java user groups and support groups?



Modems

Telecommunications consultant John Navas has created a useful public-service site (www.aimnet.com/~jnavas/modem/faq.html) about modems, with information on the new 56-Kbps models, modem FAQs, news, and links to Usenet newsgroups. Though Navas doesn't offer technical support (a wise move), his site includes troubleshooting tips, general Q&As (like what the heck is a UART?), information about advanced technologies (such as ADSL, SDSL, HDSL, and cable modems), and more. Navas recently added a feature listing his picks for best modems in several categories: best for fax, best for data, best PC Card modem, and best for downloading.



DVD

Digital Video Disc

Tactical Marketing Group (www.tacmar.com) offers a clear-eyed overview of digital video disc (DVD) technology, the successor to CD-ROM. Here's where you'll get the skinny on the difference between DVD-RAM and DVD-ROM.

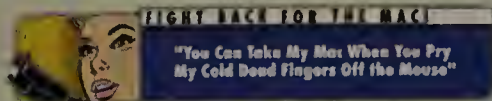
Rhapsody

Even though it's supposed to be hush-hush, Apple has posted a helpful page about Rhapsody (www.macos.apple.com/macos/releases/rhapsody/), its next-generation operating system due in 1998. The nuts and bolts of Rhapsody are covered, along with details about Apple's product strategy, an architectural diagram, and information about Java integration.

Features editor HOWARD BALDWIN was too busy coauthoring *Teach Yourself Mac OS 8 in 24 Hours* (Hayden Books, 1997) to build his own Web page.

Power Computing (www.powercc.com)

HIGHLIGHTS: Navigation is fast (the site runs on Power Computing's own hardware); you can build and price your ideal Mac system online.
LOW POINT: New design is way too busy.



PowerTools (www.pwrtools.com)

HIGHLIGHT: Lets you configure your own system online, complete with prices for options and peripherals.
LOW POINT: Somebody forgot to run the grammar and spelling checker; misspellings are abundant.

Tatung

(www.tatungusa.com)

HIGHLIGHTS: None.

LOW POINT: None.

The company has announced it's making Mac systems, but as we went to press, the site was still incomplete, with no information about its upcoming Macs.

Umax Computer

(www.supermac.com)

HIGHLIGHTS: On the front page are e-mail addresses, specifically for rants, raves, questions, and job openings; the graphics look great.

LOW POINT: Why would we want to talk to the company's lawyer (whose e-mail address is in the contact list)?

by Mel Beckman

Connect

FOR FASTER INTERNET ACCESS AND ADVANCED VOICE FEATURES, GO DIGITAL

So you're setting up a small office or home office, and you need voice, fax, and modem lines. You also want a fast Internet connection for Web surfing (which you now refer to as research). The limitations of both your budget and your phone lines rule out a multi-line phone system, though.

Fear not. You can have the capabilities you seek for a lot less money than a full-fledged office switchboard, and do it all on your existing phone lines, using ISDN (Integrated Services Digital Network). A single ISDN line costs about as much as two business phone lines, but in addition to giving you two voice lines, it lets you have multiple phone numbers; features such as call waiting, forwarding, and transfer; and high-speed digital Internet access at 128 Kbps or higher. And it does all this over a single pair of copper wires, which means you won't need to have more installed.

Although ISDN has a reputation for being hard to set up, if you understand some key terminology, follow a checklist, and stick to a few rules of thumb, you can get ISDN in your office without being a rocket scientist. As a consultant to several phone companies, I've installed ISDN all over the West. Here's my plan for a successful setup.

• **Availability** Although ISDN is widespread, it's not yet a universal commodity. Determine whether ISDN is available in

your area and how much it costs.

• **Selection** Pick the ISDN equipment that best fits your needs.

• **Installation** After you order the ISDN line, wait for your phone company to install it.

• **Configuration and Confirmation** Connect and configure your equipment; then test to ensure that everything operates as expected—before the installer leaves.

Can You Get ISDN?

This may seem like an obvious initial step, but many people miss it. ISDN may not be available where you live, even if your local phone company offers it. Your distance from the telephone company's central office, the type of switch located there, and the availability of installed copper wiring near your location are all factors in ISDN's availability. For example, if you're more than 3.5 miles (officially, 18,000 feet) from a central office, the telephone company must employ devices called repeaters to strengthen the signal to you.

So check with your phone company first or go online to Dan Kegel's ISDN Web page (www.alumni.caltech.edu/~dank/isdn/isdn_ai.html#TELECO/) for links to each provider. Ask whether ISDN is available, based on your phone number. If it is, ask the company to perform a "prefielding" check, in which a representative visits your premises and makes sure that the copper wires between you and the central office will support ISDN. There



JOHN RITTER

with ISDN



should be no charge for this service. At the same time, get pricing information—installation cost, recurring monthly fees, and per-minute usage charges.

Don't order your ISDN line on this initial contact, though! To ensure that the phone company configures the line to work properly with your ISDN equipment, you must select your equipment before placing an order. An incorrectly ordered ISDN line is very difficult to fix; often the only solution is to cancel the order and start over. Why? ISDN is such a new technology (available for less than two years in many places) that most telephone companies don't yet have reliable procedures for changing the specifications of an installed ISDN line.

Select Equipment

ISDN equipment comes in many forms, and what you buy determines the set of features you'll have at your disposal. For your small office, you'll want one of two items: an ISDN terminal adapter (sometimes called an ISDN modem because it connects to your Mac's serial port), which is about the size of a traditional modem; or an ISDN router, which connects to your computer's Ethernet port for Internet access and is about the size of a large paperback book. Whichever one you get, it should also have analog ports for your traditional phone, fax, and modem connections (see the infographic "Hooking Up ISDN"). (If you do not

need analog ports, consider Sagem's Planet ISDN [see *Reviews*, March 1997].)

What's the difference between terminal adapters and routers? Cost and speed. An ISDN terminal adapter is cheaper than an ISDN router—starting at under \$400, versus \$600 to \$1200. It connects directly to your computer's serial port, and thus can provide Internet access for that computer. An ISDN router connects to your Mac Ethernet port, or to an Ethernet hub into which you can plug several computers—including others besides Macintoshes.

Most ISDN terminal adapters don't give you the full benefit of ISDN's speed, due to the conversion between ISDN's synchronous signaling and the asynchronous signaling of your Mac serial port. For example, a 128-Kbps ISDN data stream must be slowed to 119.2 Kbps at the Mac serial port, and then slowed by another 15 percent to accommodate the serial port's 10 bits per byte versus ISDN's 8 bits per byte. The net yield is about 100 Kbps—a 20 percent speed penalty. Ethernet's 10-Mbps speed means an ISDN router can get a full 128-Kbps throughput, and even up to 512 Kbps with built-in data compression.

If you're on a budget, you only need to connect a single computer, and if it doesn't have an Ethernet port, a terminal adapter may be acceptable. However, if you need or will later want to have Internet access for several computers, and

want the best possible speed, an ISDN router is well worth the extra cost.

Many ISDN hardware vendors—Ascend Communications, Farallon Communications, and 3Com, for instance—offer both terminal adapters and routers. Motorola offers two ISDN terminal adapters (see the sidebar "ISDN Buyer's Guide" or *Reviews*, May 1996 and September 1996).

On the software side, consider Vicom Technology's (415/691-9520, www.vicomtech.com) \$99 SurfDoubler, which lets two users access a single Internet account through one Mac. Vicom's Internet Gateway extends this to an unlimited number of people (at \$75 per user).

For Internet access, a limiting factor in which ISDN equipment you buy is what your prospective Internet service provider (ISP) will support. So shop around first for an ISP, get its recommendations for equipment, and select from those options.

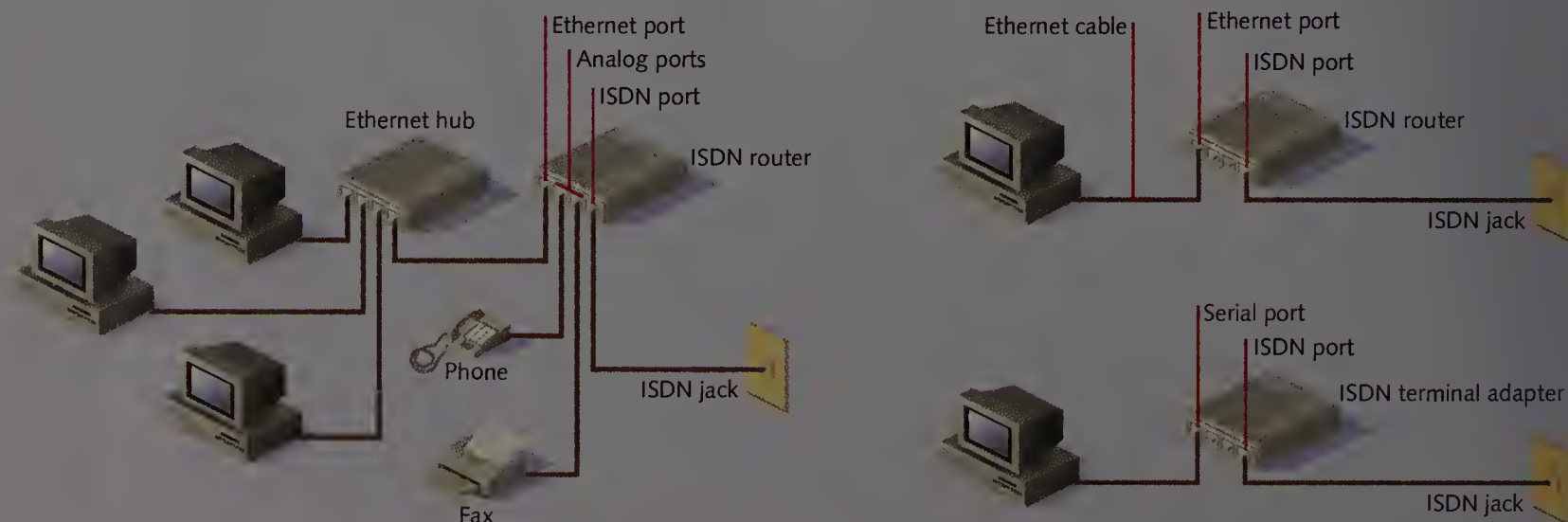
Other powerful ISDN features include the ability to have more than one call on hold at a time (multiple call appearances); incoming call rollover; multiple telephone numbers; caller ID; and call routing, which allows you to direct an incoming call to an appropriate analog port based on the number that was called.

Once you've chosen ISDN gear that both you and your ISP can live with, it's time to call the telephone company.

Hooking Up ISDN

An ISDN line looks like a regular phone line, with a modular phone jack. However, instead of plugging directly into an analog phone it connects first to a special piece of gear called ISDN customer-provided equipment (CPE in phone company talk)—the ISDN terminal adapter or router. From the ISDN equipment you'll run a cable—

either a serial cable for a terminal adapter or an Ethernet cable for a router—to your computer or small-office network, as well as phone cabling to your analog phone, fax, and modem devices. The ISDN equipment lets all these devices share the two ISDN channels, so you can have two calls in progress simultaneously.



How to Speak the Phone Company's Language

When you're ordering ISDN or working with your ISDN installer and equipment vendor, understanding some telephone company terminology can be a big help. These are the terms you're most likely to encounter when you're installing ISDN.

Basic rate interface (BRI) A single ISDN line supporting two 64-Kbps data channels or two voice channels, or a combination of the two.

Central office (CO) The telephone company building, usually within a few miles of your home or office, where your phone lines connect to switching equipment.

Customer-provided equipment (CPE) The equipment you supply that connects to your ISDN line, such as an ISDN router or terminal adapter.

Demarcation point The box or wiring panel at your home or office where all the phone company wiring terminates (also known as "network interface"). The phone company is officially responsible only for wiring up to this point, unless you make other arrangements.

Order the Line

You need to not only talk to the right people inside your telephone company, but know their lingo. Review the terms in the "How to Speak the Phone Company's Language" sidebar and then make sure you're actually talking to your phone company's ISDN order specialists.

It's best to have your ISDN equipment in your hands, complete with documentation, when you place your order. The order specialists need to know the specific make and model of ISDN gear, and may need to ask other questions that you can answer from your unit's documentation. Virtually all equipment manuals provide detailed information on ordering procedures. You should read it carefully to understand the calling features your ISDN gear supports.

In general, you want to ensure that your line supports both voice and data on both channels; has the multipoint option configured; and has at least two phone numbers, one for each channel. If you plan to use extended features, such as multiple directory numbers and multiple call appearances, be sure to say that.

Finally, you should determine who will do the final wiring at your location—

Directory numbers (DNs) The phone numbers assigned to your ISDN line—you can have up to 15.

Due date The date the phone company plans to install your ISDN line and make it operational.

Network termination (NT1) The equipment you supply that connects to your ISDN line. Usually this refers to the entire piece of equipment, such as an ISDN router or terminal adapter, although technically the NT1 is just a component inside these devices.

Order number A number assigned by the phone company to your order to track its progress. You will use this number for all conversations with the phone company, so record it and don't lose it!

Prefielding The process by which the telephone company checks to make sure that ISDN is available in your area and that you have an available pair of wires.

Premises Sometimes abbreviated *prem*, the physical street address where you're having the ISDN service installed.

you or the phone company. Normally the phone company only routes your ISDN line up to the demarcation point—your outside phone box or the wiring closet in your office building. You must pay extra to run the line right to your ISDN device. If you can afford the wiring fees—\$50 to \$100 per hour—you can avoid finger-pointing later on. Just don't take on the wiring chore unless you're experienced with phone installation.

If you already have unused wiring in your office, you may be able to use that for ISDN, but have a telephone technician inspect it first—any existing wiring you plan to use must go straight to your ISDN gear, and not have extensions to any other jacks or telephone equipment on your premises.

One problem you may encounter, even if you've licked the wiring problem inside your office, is a shortage of underground or telephone-pole copper pairs coming into your office. If you don't have any spare incoming pairs, the telephone company may charge you a princely sum (thousands of dollars) to dig a trench for additional wires. In this situation, you may choose to take over an existing analog line, replacing its function with the

Provisioning information The order specifications for your ISDN line: the type of equipment you're using, custom calling features, and whether you will use the line for both voice and data transmission.

RJ-11 A type of jack or plug that has four metal conductors. This is a normal phone-line connector and will work for ISDN, too.

RJ-48 A type of jack or plug that has eight metal conductors. This normal phone-line connector will work for ISDN, but it's overkill and much more expensive than an ordinary *RJ-11*, which works just as well.

Service Profile Identifiers (SPIDs) Two special numbers you use to program your equipment for the ISDN line.

Translations The phone company's internal configuration for your ISDN line. Most phone companies consider this proprietary information and won't give it out. However, if the ISDN translations don't match the *provisioning information* for your line, you could have problems.

two analog jacks your ISDN supplies. Keep in mind that those jacks are located on your ISDN device, so you'll have to run separate inside wiring from the device's analog ports to the phone, fax, or modem equipment.

Ask for a written confirmation of your order, which will include an order number you can use to track its progress. Also ask for a due date—the approximate day your phone company will activate, or turn up, your ISDN service.

Configure, Install, and Test

On the appointed day, a phone company installer will arrive to perform final wiring and testing. Before then, you should have received from the phone company the information you need to configure your ISDN equipment: the switch type; phone numbers for each B-channel; and special numbers called Service Profile Identifiers (SPIDs), one for each B-channel. In the United States, the switch type is either National ISDN 1 (NI-1), the current nationwide standard, or the name of a specific manufacturer's switch (usually Northern Telecom's DMS-100 or AT&T's 5ESS). Outside the United States there are many

other possibilities. All you have to do is match what the phone company tells you.

Your ISP may provide configuration assistance; if so, take it. Otherwise, study the ISDN device's user guide carefully and perform as much advanced configuration as possible. Some ISDN gear can't be configured at all unless the ISDN line is already connected. Many ISDN devices have automatic switch and SPID detection that determines these settings for you from the active ISDN line.

If possible, you should try out the line yourself with your ISDN equipment before the installer leaves. Connect the ISDN device to the ISDN jack using a normal single-pair telephone cable (the flat kind with modular plugs on each end); then connect your analog devices and verify that you can make and receive voice calls. If these work, your ISDN line is functional.

ISDN used to be difficult to get working, but today ISDN turnups are often painless. If voice calls don't work, ask the installer for the phone number of the phone company's ISDN service center, in case you need to involve it in troubleshooting. Your ISDN equipment will

often display an error code, called a cause code, useful in diagnosing problems (the code is usually displayed via the ISDN-management software provided with your device, or via a terminal emulator connected to the device with a serial cable). The key to solving problems is careful review of your ISDN device configuration settings coupled with systematic testing. Seek the assistance of your ISP and the phone company's ISDN service center. After installation is complete, contact your ISP to activate your Internet service, and then test your Internet connection, as well as any special analog features you're using.

Macworld's Buying Advice

Because you'll have to live with your ISDN equipment and feature choices for a long time, make them carefully. Scrimping on ISDN hardware costs may save dollars in the short term, but in the long term it buys inconvenience, so don't make price your primary determining factor. Remember that you'll get back many times the cost of the ISDN hardware in improved productivity.

To this end, an ISDN router is

almost always a better choice than an ISDN terminal adapter, even for an individual user. You get speed and flexibility, plus the option to expand your office network without buying additional equipment or software. It also helps to choose an ISP that offers ISDN hardware configuration services, which can make your ISDN turnup a turnkey operation. Since the ISP takes responsibility for getting everything working, its experienced technicians will deal with the phone company and ISDN hardware problems.

ISDN is ready for prime time, and it can be a cost-effective way to get a lot of bang for your telecommunications dollar. Running voice and high-speed data over the same line leverages the existing phone wiring in your small office or home office. Fast Internet access is a boon to your business, and advanced voice features make you more efficient and put a more professional face on your telephone image. As long as you plan and make careful buying decisions, ISDN is a wonderful way to be connected. **m**

Contributing editor MEL BECKMAN has consulted on more ISDN installations than he likes to think about.

KEVIN CANDLINA

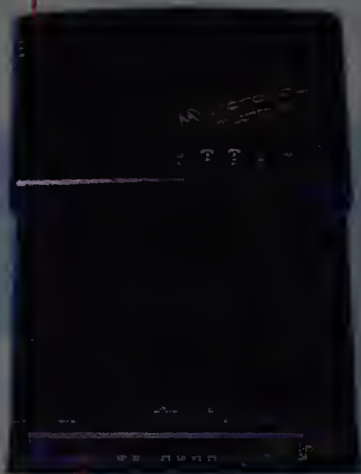
ISDN Buyer's Guide: Terminal Adapters and Routers

The \$399 Netopia 412 terminal adapter is easy to set up, but for an additional \$99 the company will handle installation. **Company:** Farallon Communications (510/814-5000, www.farallon.com).



The \$450 Pipeline 15 is one of two ISDN terminal adapters to support Caller ID. **Company:** Ascend Communications (510/769-6001, www.ascend.com).

The \$395 BitSurf Pro and \$285 BitSurf Pro EZ provide excellent analog port features, as well as priority technical support for new ISDN users. The BitSurf Pro EZ also supports Caller ID. **Company:** Motorola (205/430-8000, www.mot.com/isdn/).



The \$895 Courier I-modem terminal adapter (above) from U.S. Robotics (now part of 3Com), is expensive and has no Mac configuration software. 3Com's \$499 Impact IQ (left) includes Mac configuration software and an analog port. **Company:** 3Com (408/764-5000, www.3com.com).

The \$695 Pipeline 25 router is short on features, but the \$995 Pipeline 75 is widely supported on the Internet. Both have a Java-based tool for configuring Macs. **Company:** Ascend Communications (510/769-6001, www.ascend.com).



The \$1099 Netopia 435 and the \$849 Netopia 635 include two analog ports, unlike the earlier Netopia 440. As with the terminal adapters, the company will handle router installation for an additional \$499. **Company:** Farallon Communications (510/814-5000, www.farallon.com).

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Secrets

The Thrill of the Hunt

FERRETING OUT THE FILES YOU WANT WITH FIND FILE'S HIDDEN FEATURES

by Joseph Schorr

The Mac's environment of files, folders, icons, and windows may be known collectively as the Finder, but when it comes to *finding*, the real work is done by Find File, the powerful little search utility that continues to be refined. When you need to dig up all the Microsoft Excel spreadsheets you've edited in the last two weeks, or you want to locate the 27 extra copies of SimpleText that are scattered around your hard drive, or you've lost an important file and can remember only that it contained the word *mothball*, the Find File command can save you plenty of time.

Tap into Find File's hidden features, though, and your searches can be even faster and more informative. When I wrote a column last year about Find File secrets, I found that the utility had more undocumented features and hidden shortcuts than I could cram into a single column (see *Secrets*, February 1996). For whatever reason, Apple seems to have planted more juicy secrets in the Find File utility than in any other system component. So here's another batch, for fast, efficient file hunting and gathering.

Stay on Target

One of the best ways to speed up a file search is to narrow its scope by targeting a specific volume or folder. The topmost pop-up menu in the Find File window—the one preceded by the words *Find Items*



—lets you restrict your search to a single volume, but the little-known secret is that you can switch your search from one disk to the next without touching the mouse: press ⌘-1 to target your start-up disk, press ⌘-2 to single out the next volume mounted on your desktop, ⌘-3 for the next, and so on. With this keyboard shortcut, you can quickly navigate up to nine volumes, targeting only the one you really need for each search.

Even if you include multiple volumes in your search, there's another way to dramatically speed up the process: hold

down the shift key when you press the Find button. This makes the Find File program automatically bypass all ejectable disks, such as Jaz disks and CD-ROMs—even if you have On All Disks chosen in the Find Items pop-up menu. This shortcut can reduce search times significantly, because it means Find File will ignore the 600MB of files on the CD-ROM you happen to have mounted.

Remember, too, that you can narrow a search to even *less* than one volume. If you have a hunch that a file might be hid-

continues

ing within a particular folder, select that folder and drag it onto the Find Items pop-up menu. The menu changes to In The Finder Selection. Find File then focuses its search on only the folder you've specified. (You can also do this with multiple folders; just drag the folders you want to search en masse onto the Find Items pop-up menu.)

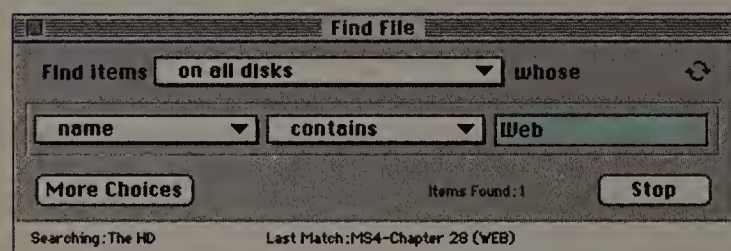
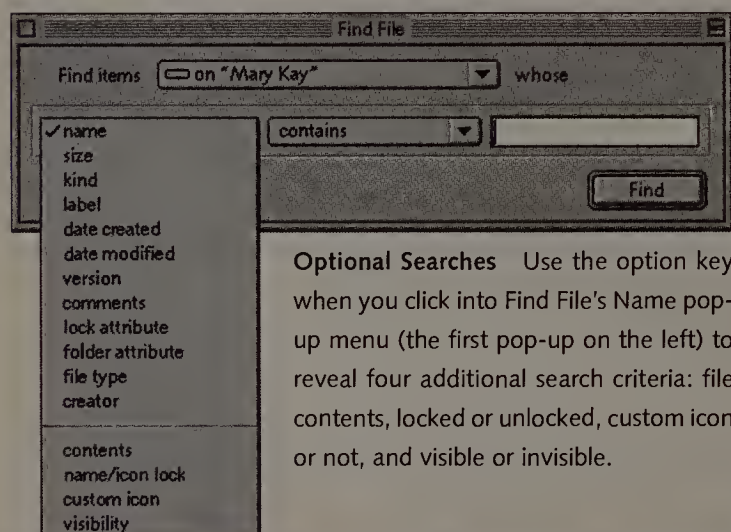
Faster Content Searches

Find File's most powerful feature is its ability to search by content, but for some reason Apple chose to hide this feature (see "Optional Searches"). You have to hold down the option key while choosing the Name pop-up menu to reveal four secret criteria: contents, name/icon lock status, custom icon, and visibility.

When you search by contents, Find File pokes into every file, searching for a text string you specify. It's powerful, but terribly slow. If you speak and write in English, however, there's a way to make those interminable content searches go much faster: press the option key when you click on the Find button. That triggers a fast ASCII search—looking only for standard English-alphabet characters.

Find and Print

Once you've found the items you're looking for using Find File, you can open, copy, alias, or trash files from with-



The Search Is On No need to guess at what Find File is up to. By pressing ⌘-return or the ⌘ key while clicking on Find to trigger searches, you get an added status bar that shows you which volume is being searched and the name of the last file successfully found.

The option key unlocks a world of secret features in Find File. Just about every button, command, and pop-up menu in the Find File utility gains added power used in conjunction with the option key.

HERE ARE SOME EXAMPLES:

- Hold down the option key when you choose Find File from the Apple menu to open the program's window centered horizontally on your screen.
- Press and continue holding down the option key while clicking on the Find button to open the Items Found window directly below the Find File window.
- Option-drag a volume name from the Find File window's Find Items pop-up menu to the Trash to unmount the volume.
- Option-drag one line containing search criteria to the Trash to remove it from the search, leaving the other criteria intact.
- Option-drag items from the Items Found window to copy them.
- Hold down the option key while clicking on the Name pop-up menu to reveal Find File's four secret search criteria: contents, custom icon, name/icon lock status, and visibility.
- Press option while double-clicking on a file in the Items Found window to simultaneously open the file and quit Find File.
- Option-click on the Find button when searching by content to restrict the search to standard English ASCII characters.
- Option-drag items from the Items Found window into any drag-and-drop-aware text editor to get a detailed tab-delimited report on each of the items, including file names, sizes, type and creator codes, labels, and creation and modification dates.

in the Items Found window—but did you know you can also print them directly from the Find File program? In the Items Found window, select the name of the file you want to print, then press ⌘-P. Find File automatically launches the appropriate program, opens the file, and summons the Print dialog box. Simply pressing return sends your job to the printer, closes the file, and quits the application. Holding down the option key while choosing the Print Item command prints your file and quits Find File in the process.

Get More Info—or Less

Once you set Find File loose on a search, it chugs away at the task without giving you much feedback—until it produces a list of matches in the Items Found window. If you'd like a peek at what Find File is up to while it conducts a search, hold down the ⌘ key when you click on the Find button (or just press ⌘-return). A status bar appears at the bottom of

the Find File window, showing the name of the volume currently being searched and the name of the last item successfully found (see "The Search Is On"). The benefit? If the name of the item you are looking for happens to flash by, you can interrupt the search immediately using ⌘-period and retrieve the file in the Items Found window.

One last tip: Find File allows you to search by up to ten different criteria; every time you click on the More Choices button (or press ⌘-M), an additional search criterion appears. But suppose you decide, after adding several lines of search criteria, that you want to return Find File to its default state—searching by just a single attribute. It turns out there are three different ways to do it in just one step. Shift-click on the Fewer Choices button or press ⌘-shift-R, and all your extra choices disappear. Shift-option-drag moves the whole block of additional attributes to the Trash; remove a single search criterion from the middle of the pack by holding down the option key to drag a single row to the Trash. **m**

Contributing editor JOSEPH SCHORR is coauthor of *Macworld Mac Secrets*, fourth edition (IDG Books Worldwide, 1997).

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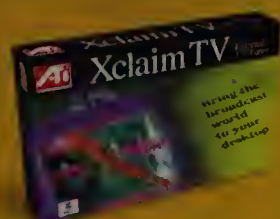
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Tips, Tricks, and Shortcuts

by Lon Poole

After double-clicking deep into folders within folders to find an item you need, you end up with what? Ugly window litter, that's what—unless you had the forethought to hold down the option key as

you opened each folder, thereby simultaneously closing the window that the folder was in. Sure, you can close all the Finder windows at once by ⌘-option-clicking any close box or pressing ⌘-option-W, but suppose you want to keep the frontmost window open? Now you're slogging through the windows one by one, closing them with the mouse or the ⌘-W shortcut. Blech.

Wayne Maddison of Tucson, Arizona, saves wear and tear on his carpal tunnels with a small AppleScript application that closes all the Finder windows below the frontmost. You can get in on the automated action by using the Script Editor program (which comes with System 7.5 and later) to enter and save the following as an AppleScript application:

```
Tell application "Finder"
  Copy every window to windowlist
  Close rest of windowlist
End tell
```

In case you're wondering how this script works, the second statement in the script copies a list of all Finder windows into the variable named windowlist. In the third statement, the "rest of" property causes the Close command to operate on all but the first window in the list. This construction executes faster than iteratively closing one window at a time with a repeat loop.

For quick access to this script, save it in the Apple Menu Items folder or in the Automated Tasks folder, which is located in the AppleScript folder (inside the

Apple Extras folder) and has an alias in the Apple Menu Items folder. If you use speech recognition, put the script or an alias of it in the Speakable Items folder, with a name like Close Other Windows, and boss your windows around.

ClarisWorks Default Font

Q Is there any way to reset the default font in ClarisWorks 4.0?

PHILIP MACKETHAN
Richmond, Kentucky



A Create a new document and change the font to the one you want ClarisWorks to use by default (you can also change other settings such as the page margins and style sheets or even put in boilerplate text or graphics that you want to be part of every new document). Then use the Save As command to save the document as stationery with one of the following names, according to the type of document: ClarisWorks WP Options (for word processing defaults), ClarisWorks DR Options (for drawing defaults),

ClarisWorks PT Options (for painting defaults), ClarisWorks SS Options (for spreadsheet defaults), ClarisWorks DB Options (for database defaults), or ClarisWorks CM Options (for communications defaults). Selecting the Stationery option in the Save As dialog box prompts ClarisWorks 3.X or 4.X to automatically open the correct folder in which to save these default files.

Now when you create new documents, ClarisWorks 3.X or 4.X uses the settings from the appropriate type of default-options stationery document (word processing, spreadsheet, and so forth) that you saved. To create a new document without your custom default settings, use the New command (not a shortcut button) to bring up the New Document dialog, and select a document type whose name begins with Standard, such as Standard Word Processing.

Software on Your Web Site

Q I am totally revising my Web site and was wondering if it would be legal to put freeware, such as ResEdit, on my site for downloading, if all the ownership credits were given.

JEFFREY POPE
via the Internet

A You need to look at the license agreement or distribution policy for each program you want to post on a Web or FTP site. Typically, shareware and freeware authors say it's OK to distribute their work as long as you don't make a profit from it. You could post an item with those terms on your site for

continues

downloading without getting permission from the author. A typical distribution policy also allows you to include an item as part of a nonprofit CD-ROM, but asks you to send the author a copy of the CD. If you have any doubt about the distribution policy or license terms for a program, contact the author for permission.

Apple distributes lots of free software, but the software is not what I'd call free-ware or shareware. You need a license to post or distribute ResEdit or anything else that Apple Computer has copyrighted. Contact Apple Software Licensing (512/919-2645, gemma.apple.com/mkt/registering/swl/swl.shtml; see "Distributing Shareware Online").

Keep in mind when you create a Web site that most Webmasters consider it very bad etiquette to include a link that automatically downloads software from someone else's site without permission. If you include such a link, it could be construed as misappropriating the other site's server, administrative overhead, and connection bandwidth—kind of like hooking up a hose to your neighbor's faucet to water your garden. It's OK to have a link that goes to someone else's page for downloading, but Netiquette dictates it be clear that following that link leaves your site.

Virtual Memory Optional

Q Is it necessary to use virtual memory with System 7.5.5 or 7.6.1? I thought it should be set to 1MB over the actual memory. But now that I have

160MB of real memory, I really don't like to use 161MB of hard disk space for virtual memory storage. I don't mind if some applications require more memory if I don't use virtual memory, but I am worried that some programs won't work right if I don't use it. What is the definitive answer on this subject?

JUDITH EPSTEIN
Highland Park, Illinois

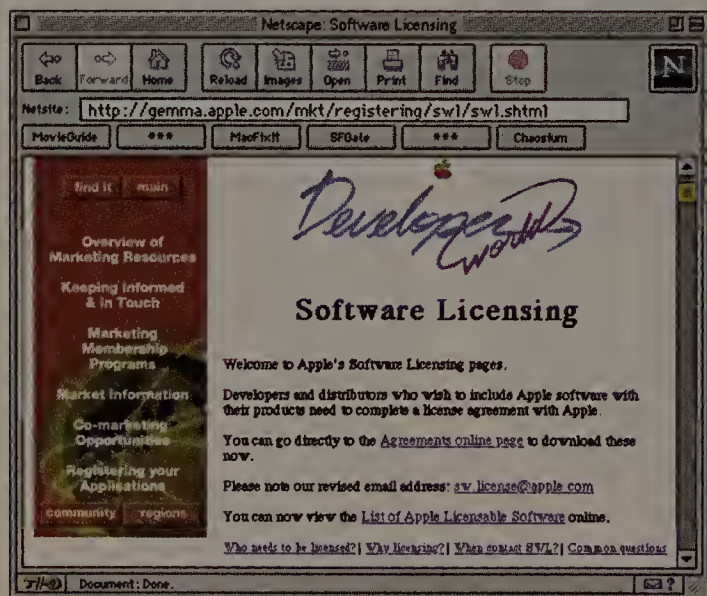
A Go ahead and turn it off. Virtual memory is pretty efficient on a Power Mac, especially with System 7.5.5 and later, but it can slow down QuickTime video and other tasks that stress the system. You could keep application sizes down by using RAM Doubler 2 from Connectix (415/571-5100, www.connectix.com) instead of virtual memory. RAM Doubler doesn't require much disk space and barely affects system performance, but your Mac will probably crash a bit more with it installed (for more information on using RAM Doubler, see "Best Utilities," *Macworld*, September 1997).

Secret Finder Shortcuts

TIP Installing the freeware control panel Hidden Finder Features by Richard Burgess activates secret Finder shortcuts that Apple designed into the Finder from Systems 7.5.3 through 7.6.1 but for some reason didn't enable until Mac OS 8. You can control-drag items to make aliases of them; press ⌘-R to reveal an alias's original; and press ⌘-delete to move selected items to the Trash. There's also an option to turn off the zooming rectangles that the Finder uses to animate opening an icon and closing a window.

I discovered that ⌘-R works not only on aliases: pressing it while a document is selected opens the folder that contains that document's creator application. This is very handy if you need to drag several documents of different applications onto one single application to open them, and one of them is a native document of that application. It saves a lot of folder clicking.

MATTEO FOGLI
Torino, Italy



Distributing Shareware Online Want to post Apple software on your Web site? Point your Web browser to gemma.apple.com/mkt/registering/swl/agreements.html and download the Apple licensing agreement (which you must print, fill out, and mail back to the address specified at the site).

Bugs and Turkeys



Adesso's Nu-Form split keyboard (213/294-4300, www.adessoinc.com) comes with a touchpad built into the curved wrist rest. The company describes the keyboard's "ergonomic numeric and cursor keypads" as making "typing more natural and comfortable." But as Wayne Maddison of Tucson, Arizona, points out, someone forgot to tell Adesso engineers that right-handed users would find manipulating the cursor via the built-in touchpad anything but natural and comfortable, since the touchpad's buttons are positioned to the left of the touchpad surface. This means a one-handed operation like click-dragging over a group of objects becomes either a two-handed exercise or contortionist training.

Macworld will send you a Bug Report or Turkey Shoot T-shirt if you are the first to inform us of a turkey or a serious, reproducible bug that we report in this column. See How to Contact Macworld.

All these options work with Systems 7.5.3 through 7.6.1; ⌘-R and disabled zoom rectangles work with System 7.5; and control-drag works as far back as System 7.1 Pro. Your discovery also works with competing freeware control panel Finder Options by Rolf Braun. Also, Miles Muri of Saskatoon, Saskatchewan, Canada, notes that ⌘-delete comes in handy for ejecting a removable disk. On many keyboards it's easier to press than ⌘-Y (Put Away) and doesn't leave a ghost icon behind as ⌘-E (Eject) does prior to Mac OS 8.—L.P.

Formatting a Folded Booklet

TIP You can produce staple-in-the-middle booklets with just ClarisWorks and an ordinary laser or ink-jet printer. The ForeFront Group's Click-Book program recommended in *Quick Tips* (July 1997) may make the job easier, but it isn't necessary.

First, choose Page Setup from the File menu and set to landscape (sideways) orientation. Then choose Document from the Format menu, select the Mirror Facing Pages option, and set the margins you want. I like to use 0.5 inch for Top, Bottom, and Outside margins, and 6 inch-

es for Inside. That large inside margin makes each page fit on half a sheet of standard-size paper.

You print the pages in two batches. To figure out how many pages to print in the first batch, count the number of pages in the document, add enough blank pages to bring the total to a multiple of 4 (because a folded booklet always has a multiple of 4 pages even if the last few are blank), and print half that total in the first batch. For example, if your document has 13 pages, you would print

pages 1 to 8 in the first batch (8 is half of 16, which is the next highest multiple of 4 above 13). Then arrange the printed pages in reverse sequential order (for example, 8, 7, 6, and so on), put them in the printer paper tray, and print the remaining pages. Unless your document actually has a number of pages divisible by 4, nothing will print on the last one to three sheets of paper you put back into the input tray. Now you have perfect single-sided camera-ready copy to take to your local printshop or copy shop

for mass double-sided duplication and saddle-stitch binding.

TIM GOETSCH
Minneapolis, Minnesota

With a large inside margin, you may find it easier to work on the document if you turn off the Show Margins option in the Document formatting dialog box. Also, you may need to reformat the text and graphics—reduce font sizes, adjust tabs, scale objects, and so forth—to fit the new page size. Alternatively, you can use the Page Setup command to reduce all the existing content 65 percent so it fits sideways on half an 8.5-by-11-inch piece of paper. Then use the Document formatting command to set the outside margin to the former left margin, and set the inside margin to three times the outside margin plus the width of your text. (This assumes equal side margins on the final, folded pages.) For example, if the left margin was 1 inch and the text was 6.5 inches before changing the page orientation and reduction percentage, then set the outside margin to 1 inch and the inside margin to 9.5 inches. You can eliminate the reformatting work if you set the page and document format before creating the content.—L.P.

Secret Navigator Shortcuts

NETSCAPE NAVIGATOR 3.X HAS A BUNCH OF KEYBOARD SHORTCUTS BESIDES THE ONES displayed in its menus. Here are more from James Arnott of Union, Oregon, and Daniel Parks of Portland, Oregon (in addition to the two mentioned in *Quick Tips*, June 1997).

Note: To use these, you must not have text or an insertion point selected in the location box near the top of the Navigator window. If you do, press tab to deselect it.

Fill your monitor screen with Navigator's window, sans menu bar and bottom scroll bar. (Repeating shortcut toggles to original view).

control-option-A or -home

Go to the Fish Cam site (when it's operational, that is).

control-option-F or -M

Go to the White House home page.

control-option-W

Hide the vertical scroll bar and show the horizontal scroll bar.

control-option-L or
control-option-page down

Hide the horizontal scroll bar and show the vertical scroll bar.

control-option-K or
control-option-page up

Hide both scroll bars.

control-option-H

Show both scroll bars.

control-option-J

Refresh the browser window.

control-option-S

Scroll window down one screenful (vertical scroll bar must be showing).

page down; spacebar; or
⌘-down arrow

Scroll window up one screenful (vertical scroll bar must be showing).

page up or ⌘-up arrow

Scroll to the top of the Web page.

home

Scroll to the bottom of the Web page.

end

Scroll down (vertical scroll bar must be showing).

down arrow

Scroll up (vertical scroll bar must be showing).

up arrow

Take the browser back a page.

⌘-left arrow or
⌘-left bracket

Take the browser forward a page.

⌘-right arrow or
⌘-right bracket

Find Empty Folders

TIP You could find empty folders using the methods described in July's *Quick Tips*, but Marc Robinson of Philadelphia suggests using the Find File program instead. It allows you to search for folders based on whether they are (or are not) empty, shared, or mounted. Then you can select the empty folders in Find File's Items Found window and use Find File's Labels menu to label them. Alternatively, you can select some or all of the items in the Items Found window and drag the selection to a common location. **m**

LON POOLE answers readers' questions and selects reader-submitted tips for this monthly column. His latest book is *Macworld Mac OS 8 Bible* (IDG Books Worldwide, 1997).

Shareware mentioned in *Quick Tips* is available from Macworld Online (www.macworld.com) or America Online (keyword *Macworld*).

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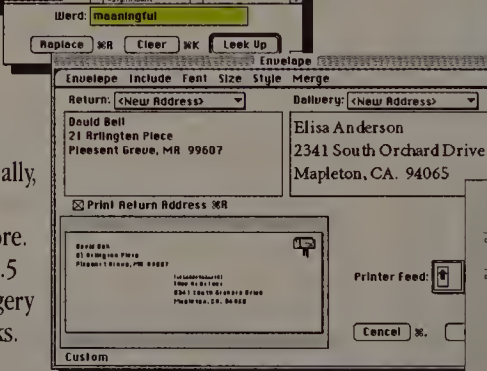
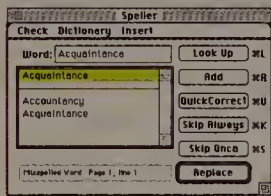
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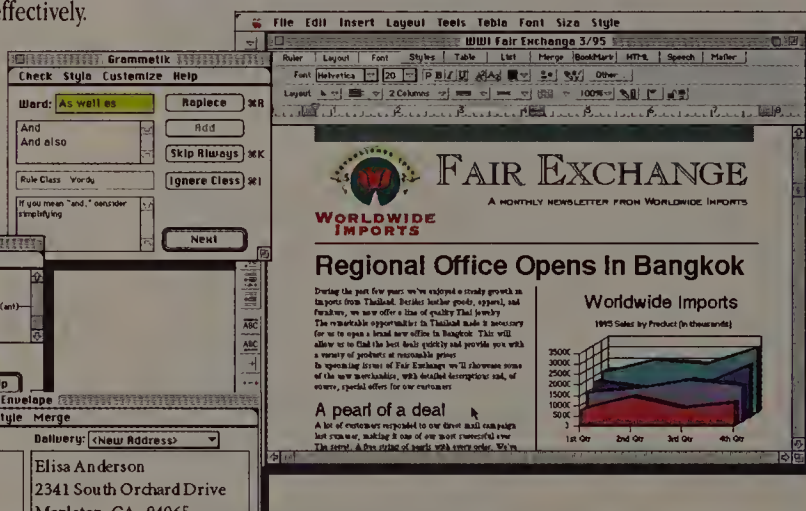
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Improving Your Web Typography, Part 2

WEB-DESIGN OPTIONS ARE PROLIFERATING—WHICH ONE IS FOR YOU?

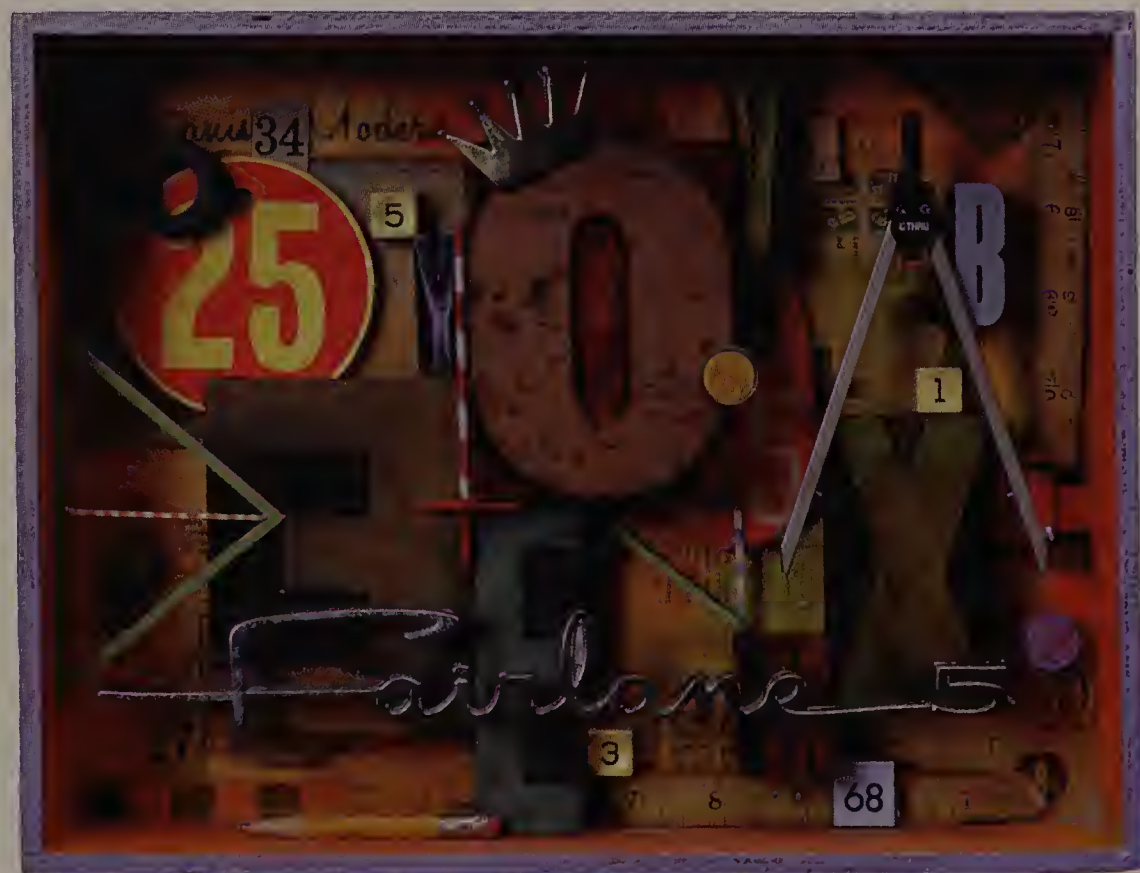
by Jim Heid

There are more options for controlling the layout and typography of your Web pages than ever before. Last month I described simple tricks: summoning specific fonts and controlling type size; using HTML tables to control columns and margins; and using single-pixel GIF images to control spacing. This month I describe some problems with those tricks and look at up-and-coming alternatives. For examples, check out www.macworld.com/more/.

The Problem with Pixels

Tables and single-pixel GIFs are popular formatting tools, but they have a drawback: hardwiring formatting information—specifying table widths in pixels, for example—violates a key tenet of HTML that makes the Web a platform-agnostic medium. If you code for structure, your pages will be usable by any HTML-supporting device: personal computer, mainframe terminal, text-to-speech converter, Braille reader, set-top box. Violate this rule, and your pages may be readable solely on personal computers equipped with a browser. Designers have flouted the rule. Why not? Web browsers are the most common surfing vehicle. If a fraction of the population can't view a page, it's a small price to pay for eye-catching, client-pleasing pages.

Over time, personal computers will lose their near-monopoly. Hard-coding



for computer screens will cause pages to render incorrectly on devices with smaller or more-limited screens, such as TV Web boxes or personal digital assistants.

The Style-Sheet Solution

Recognizing the need for both formatting control and device independence, the World Wide Web Consortium (W3C; www.w3c.org) has developed a scheme called *Cascading Style Sheets*, or CSS. The initial spec, CSS Level 1 (CSS1), is partly supported by Microsoft

Internet Explorer 3.0, and more thoroughly by Internet Explorer 4.0 (in development at this writing) and Netscape Communicator (which shipped in June).

CSS1 separates formatting from content: you create style sheets that assign formatting attributes to common HTML elements such as headings (<H1> through <H7>) and paragraphs (<P>). Those attributes are then automatically applied to their elements.

You can store style sheets within an *continues*

A LOOK AT THE FUTURE OF FONTS

As with the `` tag, the Cascading Style Sheets mechanism lets you specify a preferred font as well as a variety of fallback fonts to be used if a visitor doesn't happen to have your first choice.

Is this the Web designer's best hope for font formatting? No. The good news is that two technologies promise the ability to format text in any font on your own machine—and have your site's visitors see the same fonts. The bad news is that each technology is on its own side of the browser battle lines.

In Netscape's Corner

On the Netscape side, Bitstream's (617/497-6222, www.bitstream.com) TrueDoc records the shapes of characters used in a page and stores them in a compressed file called a *portable font resource*, or PFR. You reference this PFR file in an HTML page or in a style-sheet document. When that page is viewed on a browser that supports TrueDoc, the browser reads the PFR and re-creates the characters. In essence, TrueDoc enables the

characters you used in the original document to go along for the ride.

To minimize the PFR file's size, TrueDoc records the shapes of only those characters actually used in a given page. Bitstream's Web site has example pages that use six fonts and yield PFRs in the 50K ballpark. The PFR for pages containing only a few fonts weighs in at under 20K—a small price to pay for font flexibility.

To create TrueDoc-savvy Web pages, you need an authoring tool that can determine which fonts you've used in a page and generate the supporting PFR. At this writing, the selection of such tools is small. HexMac's *Typograph* (\$149; www.hexmac.com; also available from XChange, 415/642-3733, www.xchangeus.com) comes as a stand-alone application or a plug-in module for Bare Bones Software's BBEdit text editor. Astrobyte's BeyondPress 3.0 extension for QuarkXPress also supports TrueDoc. Many other developers of Web authoring tools, including Macromedia and SoftQuad, have announced their intent to support it.

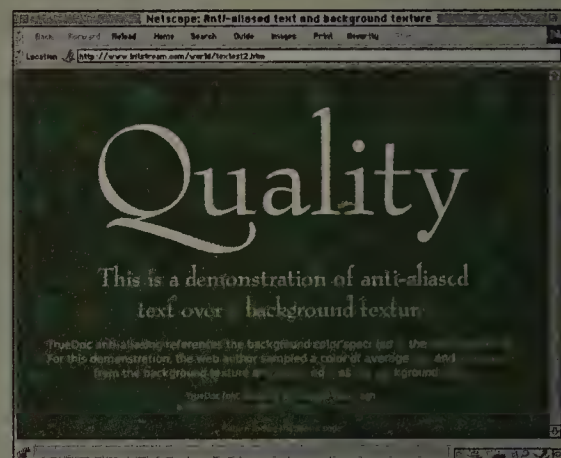
On the receiving end, Netscape Communicator fully supports TrueDoc. TrueDoc's

underlying engine is also small enough to fit into PDAs, TV Web boxes, and similarly memory-challenged devices. Given that Communicator has just shipped and that few TrueDoc-savvy authoring tools are available, it's too soon to say

how well TrueDoc will play in the real world of the Web. But I'm impressed with its potential.

In Microsoft's Corner

Microsoft's Web-font initiative is called OpenType, and it's a joint effort between Microsoft and Adobe Systems. From a Web perspective, OpenType works like TrueDoc in that it enables character shapes to travel with a document in a compressed form. But OpenType is a broader initiative that merges the TrueType and PostScript Type 1 font formats into a single format. It is also still in the press-release-and-technical-backgrounder stage. OpenType is expected to be available for Windows in early 1998, and probably later for the Macintosh.



The TrueDoc technology lets designers create anti-aliased type without turning it into a graphic.

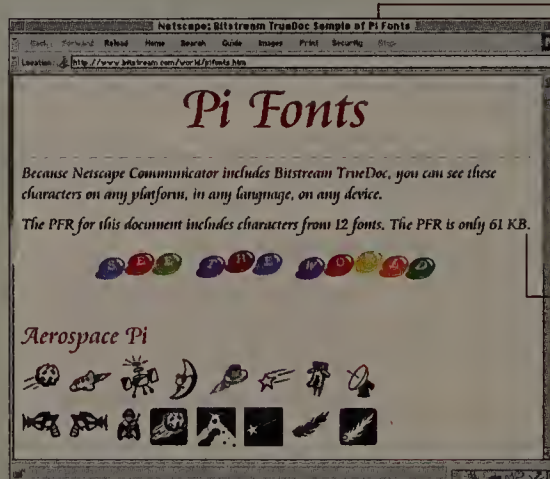
Everyone Wins—Someday

While TrueDoc and OpenType are competing technologies, they'll be able to coexist—not only on the same computer, but even in the same Web page. You'll be able to make any font you choose appear on your pages whether or not visitors have it installed in their systems.

That's assuming, of course, that those visitors are using browsers that support those technologies. As always, there will be some using older, less-capable browsers, and as a Web developer you must balance your desire for font fidelity against the need to reach the broadest audience. That will mean working harder to create pages that look good regardless of what they're viewed on—just as is the case today.

Fancy Text

All the text you see here is formatted using the `` tag and Bitstream's TrueDoc technology. The benefits: pages download faster, visitors can copy and paste text, and search engines can index it. In this example, the `point-size` attribute of the `` tag enables you to use a specific size rather than the size attribute's imprecise 1 through 7. The `<face>` tag summons fonts for which PFR files have been created. The `<link>` tag near the top of the page enables the browser to load the PFR files.



`<HTML>`

`<HEAD>`

`<TITLE>Bitstream TrueDoc Sample of Pi
Fonts</TITLE>`

`<LINK REL=fontdef SRC="pifonts.pfr">`

`</HEAD>`

`The
PFR for this document includes characters from 12
fonts. The PFR is only 61 KB.`

HTML page or in a separate file that each of your site's pages references. The latter approach enables you to redefine the appearance of an entire site by simply editing a single file. Say you decide you want all your site's headlines to appear in red 18-point Helvetica Bold instead of blue 14-point Times. Simply edit the file containing your headlines' style sheet—no need to edit every HTML page.

By segregating the formatting details and content you also eliminate the device dependence that tricks such as tables, the `` tag, and single-pixel GIFs introduce. A Web-browsing device (a *user agent*, in W3C parlance) can have a local style sheet that overrides the one referenced in a page. A set-top box's local style sheet might enlarge body text for better legibility, for example. If the device is a text-to-speech converter, the style sheet might describe which voices to use for headings and for body text.

Putting Style Sheets in Perspective

At present, the list of HTML-layout programs that support style sheets is small; it includes Astrobyte's (303/861-4861, www.astrobyte.com) \$495 BeyondPress 3.0 extension for QuarkXPress, Adobe's (415/961-4400, www.adobe.com) free HoTaMaLe extension for FrameMaker, SoftQuad's (416/544-9000, www.softquad.com) \$159 HoTMetaL Pro 3.0, and Media Design in Progress's (619/437-0664, interaction.in-progress.com) \$69 Cascade (in free public beta at press time).

If you use a different HTML tool, you aren't out of luck: style-sheet syntax is fairly easy to learn, and you can always peck the right codes into your HTML editor by hand. And it's a safe bet that future versions of all mainstream HTML tools will support style sheets.

Style sheets represent a significant step forward for Web design, but there's a problem: not only are they marginally supported in today's browsers, but millions of people are still using yesterday's browsers. When you view a page containing style sheets on an older browser, text appears in the browser's default font and size. Until style-sheet support becomes ubiquitous, tables, the `` tag, and single-pixel GIFs remain serviceable, if imperfect, formatting tools.

Bypassing HTML: Coda and Texture

If your preferred path is blocked, take a detour. That's the philosophy behind two

alternative Web-layout tools: Random Noise's (415/437-0321, www.randomnoise.com) \$495 Coda and FutureTense's (508/263-5480, www.futuretense.com) \$1495 Texture. Both products provide a degree of control over layout and interactivity that HTML can't approach.

tive features, such as buttons whose shape changes when clicked.

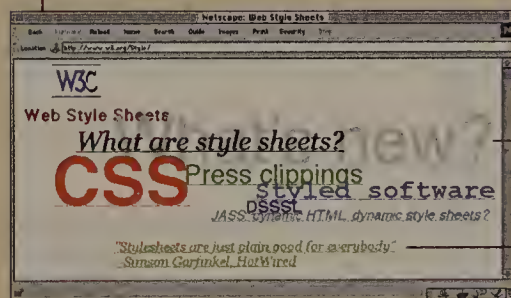
The end result of a Coda or Texture session isn't an HTML page but a file that runs within any Java-supporting browser. And therein lies the rub: visitors who use Java-ignorant browsers, such as

Style Sheets in Action

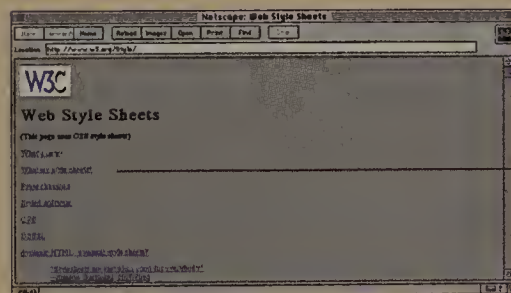
This World Wide Web Consortium (W3C) page beautifully illustrates the capabilities of style sheets. Note the overlapping text (created by different margin settings) and the use of specific fonts, point sizes, and colors. The W3C site (www.w3.org/Style/) is an excellent resource for learning about style sheets.

The `<style type>` tag starts it all off by defining the elements that will be used on the page.

```
<STYLE TYPE="text/css"><!--
BODY {
  color: #000;
  background: #FFF;
  margin-left: 7%;
  font-family: verdana, helvetica, sans-serif;
}
```



Viewed with Communicator 4.01



Viewed with Navigator 3.0

By assigning values to the properties within the `<style>` tag you have more precise control over type than you get by using `` and ``, frames, and single-pixel gifs. You can call for a particular typeface, specify its height in pixels, make it the color of your choice, and locate it precisely on the page.

```
color: #000;
font: italic 40px Georgia, serif;
margin-top: -80px;
margin-left: 5%;
```

The CSS1 spec even recognizes units familiar to designers accustomed to working in print.

```
BLOCKQUOTE {
  margin-left: 4em;
  margin-right: 4em;
  margin-top: 10pt;
  margin-bottom: 10pt;
  font-style: italic;
```

Flashy as the page is, it still works in style-ignorant browsers—visitors using Navigator, or Internet Explorer versions prior to 4.0, simply see conventional hyperlinks.

Coda and Texture provide page-layout features similar to a publishing program's. You can position elements with single-pixel accuracy, mix text and graphics, and format text in any font. Both provide font embedding, enabling visitors to see the fonts you want them to see. (Texture uses Bitstream's TrueDoc technology; Coda uses a proprietary embedding scheme.) Both also let you create interac-

the AOL browser and Navigator and Explorer versions prior to 2.0, can't view your pages. On an intranet, with control over which browsers are in use, this may not be a drawback. But on the Internet, taking the high road toward page design means leaving a lot of people behind. **m**

JIM HEID's latest book is *HTML & Web Publishing Secrets* (IDG Books Worldwide, 1997).

Mastering Your QuarkXPress Master Pages

by David Blatner

Computers are supposed to alleviate the humdrum routines that take up so much of our time. Yet many of us just ignore (or don't know how to use) some of the most power-

ful repetition-prevention tools available to us. A great example is master pages. Master pages are available in both QuarkXPress and Adobe PageMaker, though they work

somewhat differently in each. In this article, I deal with QuarkXPress.

A master page is a template for elements that repeat on several pages in a docu-

ment. You can put anything you want on a master page—text boxes, pictures, lines. Each *master item* automatically appears on every document page based on that master page. Take a book as an example: almost every page sports a page number and a header. These make great candidates for master items. (Who needs the drudgery of placing numbers on every page by hand?) Assign any new blank pages to a master page containing those elements, and page numbers and headers will appear automatically.

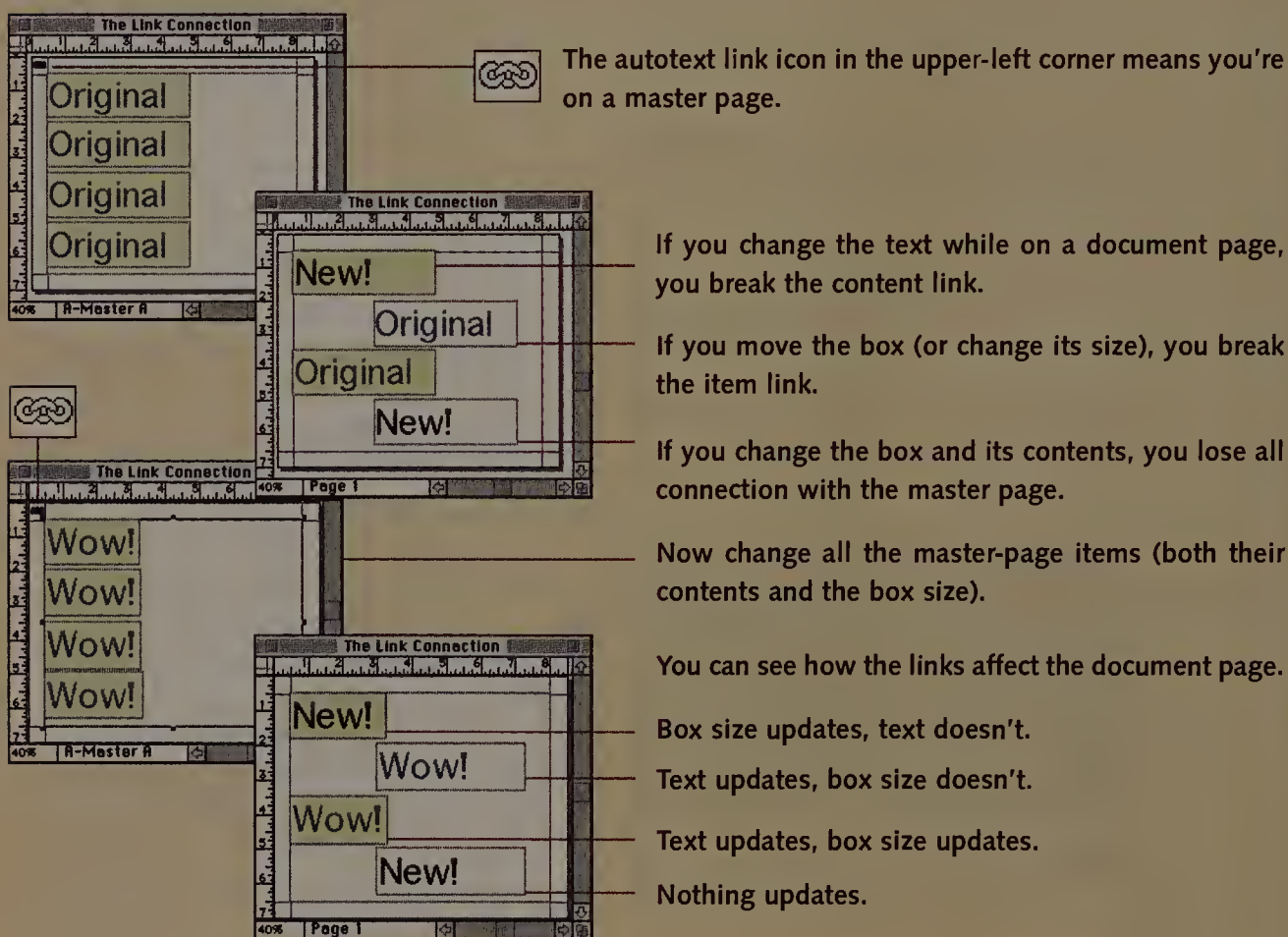
Even better, if you change the master page—say, you want to center the page number instead of placing it in the corner—the change appears immediately on every document page based on the master. It's a concept similar to style sheets, except that where style sheets define a single paragraph's formatting, master pages define the basic layout of a whole page.

QuarkXPress documents can have more than 100 master pages, each with its own design. However, you should note that all master pages in a document must be the same size and orientation.

Viewing Master Pages

Every document has at least one master page; to see it, double-click on the A-Master A icon in the Document Layout palette or select A-Master A from the Display submenu

BREAKING THE LINK



In QuarkXPress, you can't tell by looking at a page which elements are master items and which aren't. But document-page items derived from master-page items are linked to their master items. If you change a master item on a document page, you lose that connection. There are actually two kinds of links for text boxes and picture boxes: the content link and the item link. For illustration purposes, here a yellow background indicates an item link, and blue text indicates a content link.

If you change the contents of a text box on the master page, document-page boxes whose content link to that box has been broken will not update. If you change the position or cropping of a box on the master page, document-page boxes whose item link to that box has been broken won't update. Note that if you delete an item on the master page, it will be deleted from the document page only if the item and content links are both intact.

under the Page menu. If your document is single-sided, there will be one master page; if the document is set for facing pages, you'll see a two-page spread. Text, pictures, or lines that you put on a left-hand master page appear only on left-hand pages in your document; conversely, items on a right-hand master page appear only on right-hand document pages.

Quick Tricks

Here's a handful of other things you should know about master pages.

Page Numbers One of the most common master-page elements is a page number. In QuarkXPress, you get an automatic page number by typing \mathbb{N} -3 in a text box. Put this text box on a master page, and the appropriate number appears on every page assigned to that master page. (For facing pages, you must put the page number on both the left- and right-hand master pages.) The \mathbb{N} -3 character appears as $\langle \# \rangle$ on the master page, but it looks correct on the document pages.

Margin Guides There's only one way to change a document's margin guides: you *must* be on a master page. There you select Master Guides from the Page menu and set the margins you want. Each master page can have its own margin settings.

Master Pages across Documents To copy a master page from one document to another, switch to Thumbnails mode and drag a document page based on that master to the new document. The master page comes with it! Now you can delete the page in the new document, and the master page remains. **m**

DAVID BLATNER, hard at work on the fifth edition of *The QuarkXPress Book* (Peachpit Press), can be reached at david@moo.com.

Facing-Page Mixups

If you reorganize pages in a document (say, to add one page), left-hand pages may change to right-hand pages and vice versa. When you have master items on those pages, strange things can happen, because the master page gets reapplied. If you've broken the content link (shown in blue) or item link (shown in yellow) for some of the master items, those items may appear in the wrong place on the page or may be doubled (one on top of the

other). You can generally avoid this problem by always adding or deleting an even number of pages in documents that have facing pages.

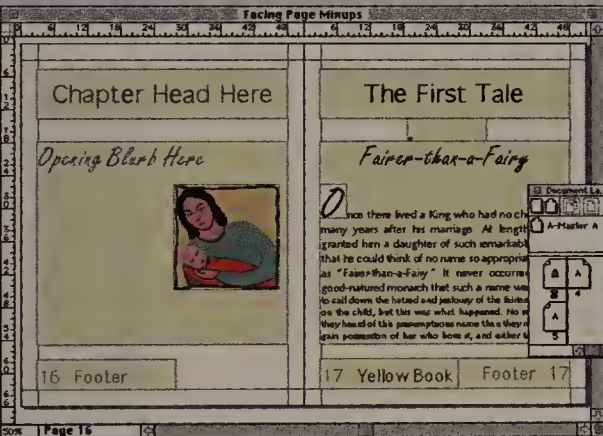
You can also choose Delete Changes from the Master Page Items pop-up menu in the General Preferences dialog box. This setting means that before it reapplies master items to a page that's moved, QuarkXPress must delete any master text box or picture box that has one broken link.



Here are master pages for a book template.



Pouring text into a master-item text box breaks the content link of that box; the item link stays intact.



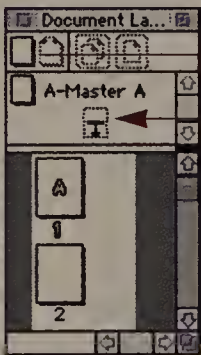
Here Master Page Items is set to Keep Changes. When a page is added, so the left-hand page becomes a right-hand page, QuarkXPress adds a set of right-hand master items. Your text winds up in the wrong place.



With Master Page Items set to Delete Changes, QuarkXPress deletes the old master items (including the box with poured text) before adding the new master items. The drop cap—not a master-page item—remains.

Master-Page Icons

- To make a new master page, drag a blank icon down to here.
- Double-click on a master-page icon to view that master page.
- To base a document page on a master page, drag the master-page icon over the document page.



Single page



Facing pages

Graphics Workshop

Creating 3-D Art from 2-D Objects

by Cathy Abes

ARTIST For the past seven years, Henk Dawson has been creating 3-D imagery for clients such as Apple, IBM, Microsoft, and Nintendo at his Bellevue, Washington, studio. His recent work can be viewed on his Web site at www.d3d.com.

HOW IT WAS DONE Many artists want to add 3-D effects to their work, but they tend to shy away from 3-D programs because they take extra time and the results often look too smooth and shiny, with a rather sterile, computer-generated feel.

Dawson combines 2-D drawings with 3-D effects to produce artwork that has a subtle 3-D quality and a hand-drawn, painterly look. For this image, he began with a scanned pencil sketch, which he refined in FreeHand. In ElectricImage, he applied texture maps created in Photoshop to the body and hair. Image2Mesh, an ElectricImage plug-in, enabled him to deform the woman's outline with a flat mesh that acts as a displacement map. (For those who don't have ElectricImage, Knoll Software's [415/453-2471] CyberMesh lets you make displacement maps in Photoshop for use in any 3-D program.)

In Photoshop, he created a decal (which covers only part of an object) from outlines of the pencil drawing. Importing the decal into ElectricImage, he placed it over the woman's 3-D-enhanced body to highlight its contours.

TOOLS Hardware: Power Mac 8500/120 with 270MB of RAM, internal 2GB hard drive, and external 2GB hard drive; Microtek MSF300SZ color scanner; Supermatch PressView 21-T monitor; Wacom ArtZ graphics tablet. Software: Macromedia FreeHand 7.0; Adobe Photoshop 4.0; Electric Image's ElectricImage 2.75; Zax Werks EPS Invigorator 1.0; Olbi Card Image2Mesh 1.2. [m](http://www.d3d.com)



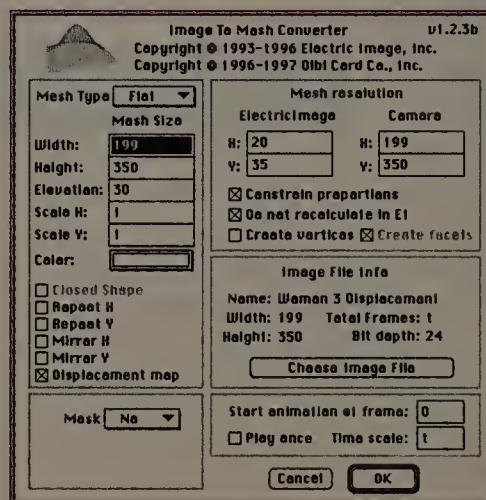
1 Using a scanned pencil sketch as a template, Dawson created and colored the 2-D art in FreeHand, exported it as an Illustrator 5.5 file (for importing into ElectricImage), and used EPS Invigorator (an ElectricImage plug-in) to import it.



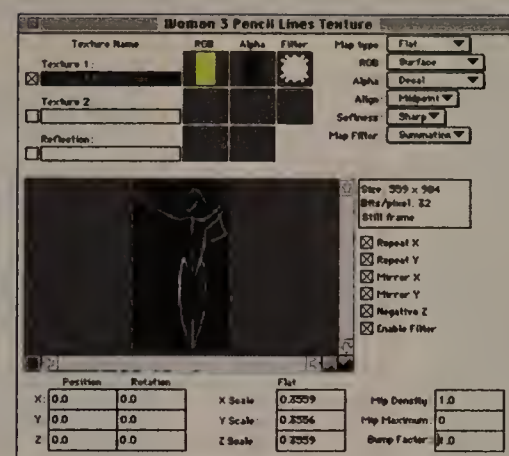
2 The wire-frame model of the woman after the model was imported into ElectricImage.



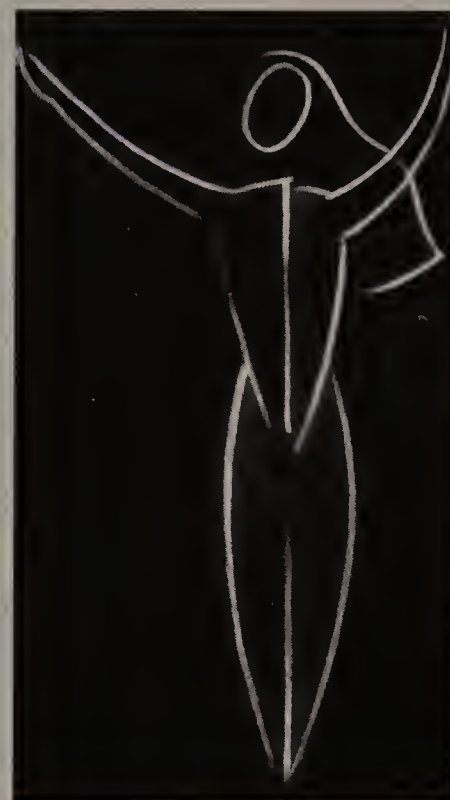
3 The 3-D model of the woman after Dawson applied Photoshop texture maps to the hair and body.



4 Using the ElectricImage plug-in Image2-Mesh Converter, Dawson created a displacement map to add 3-D contours to the body.



8 After importing the decal into ElectricImage, he applied it to the image of the woman to make the white lines follow the contours of the body.



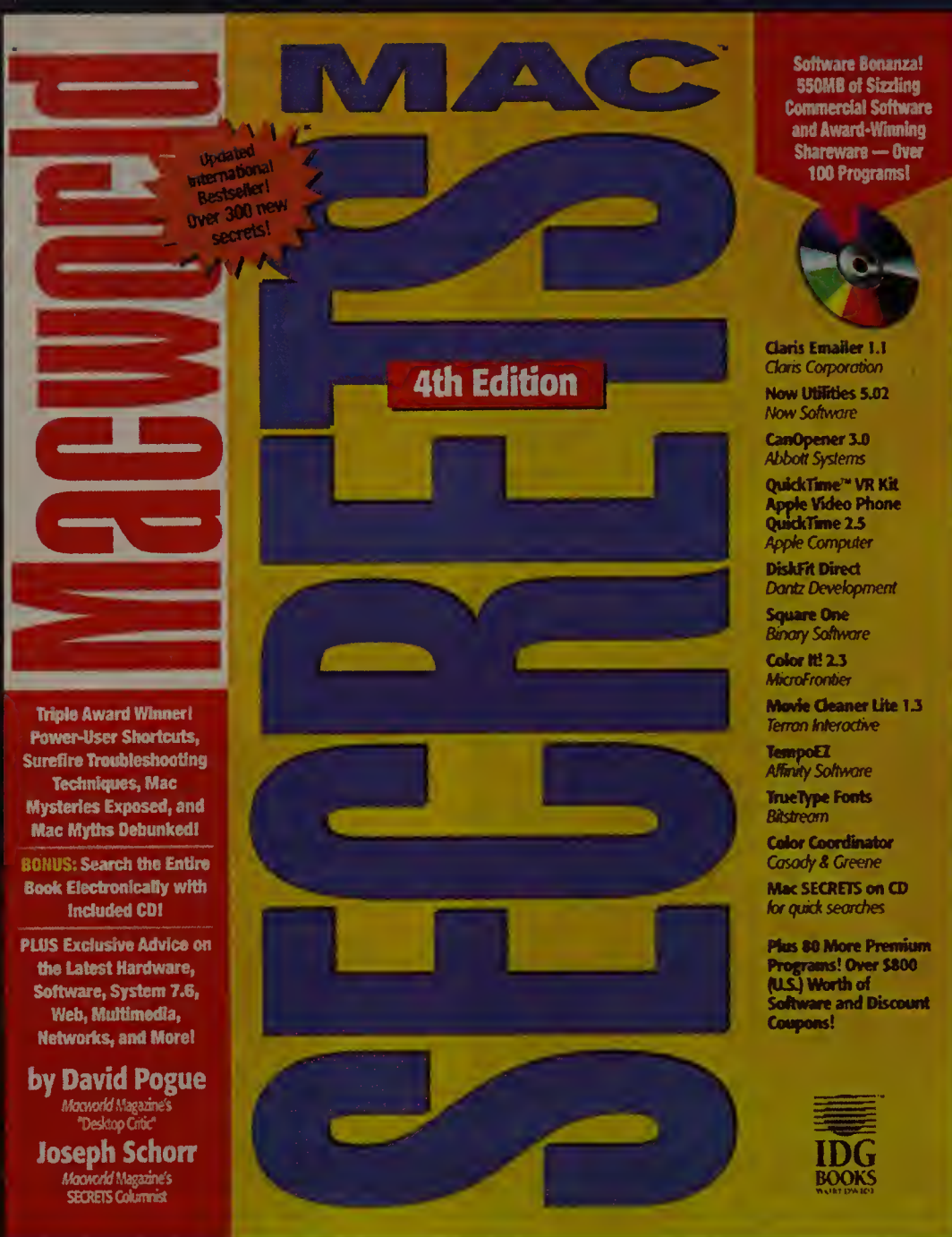
7 To emphasize the woman's body and give it a more hand-drawn look, Dawson created a decal—a Photoshop file with an alpha channel containing the pencil sketch of the woman. Inverting the mask to make the lines white and everything else black meant the lines would mask out the object underneath it while the black areas would be transparent.



5 The wire frame of the body with the displacement map applied.



6 Here the texture maps and the displacement map have been applied to the model.



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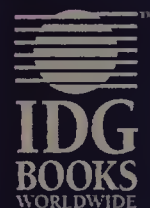
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Macworld

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Monitors	<input type="radio"/> 2	<input type="radio"/>
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Software: business/productivity	<input type="radio"/> 7	<input type="radio"/>
graphics/design	<input type="radio"/> 8	<input type="radio"/>
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other software	<input type="radio"/> 12	<input type="radio"/>
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2. Are you employed, and involved in purchase decisions for 5 or more Macs? ☐ Yes (1) ☐ No (2)

3. What's Your Opinion?

What are your main frustrations in making Mac-related purchase decisions?

- ☐ 1. Lack of expertise in assessing products
- ☐ 2. Difficulty in installing or using products
- ☐ 3. Too many choices
- ☐ 4. Not enough choices
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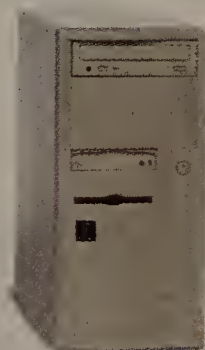
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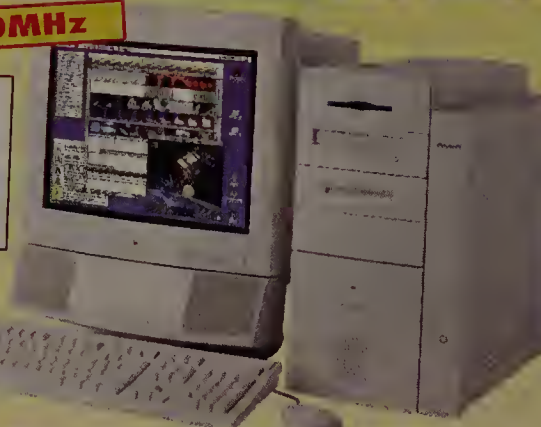
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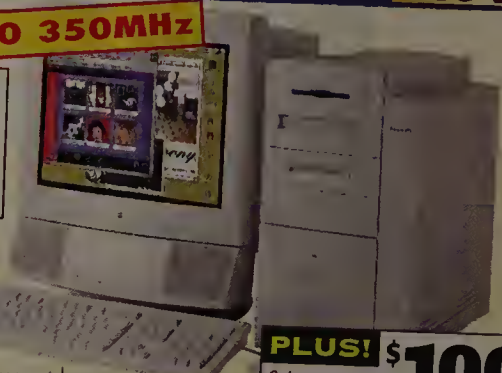
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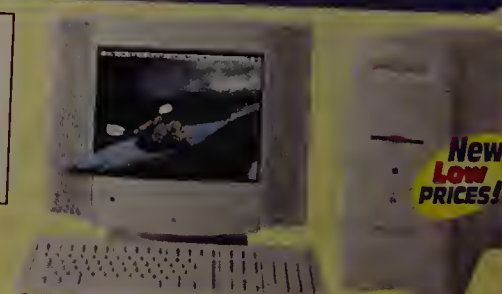
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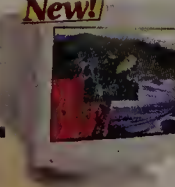
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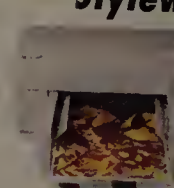
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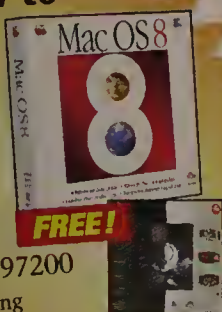
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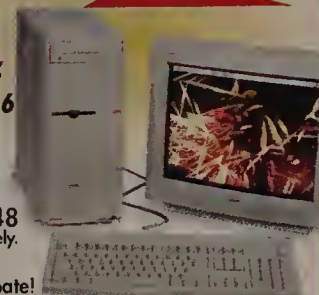
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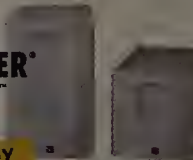
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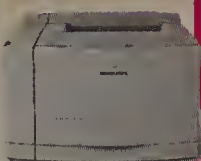
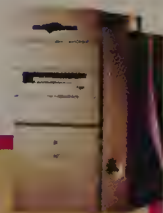
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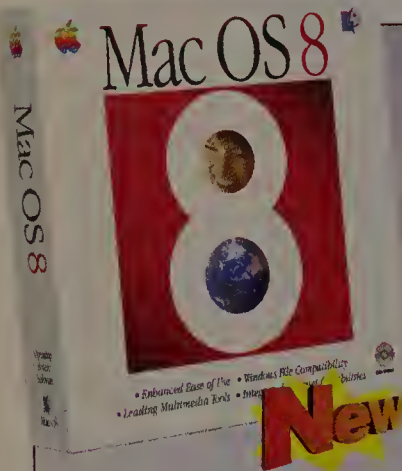
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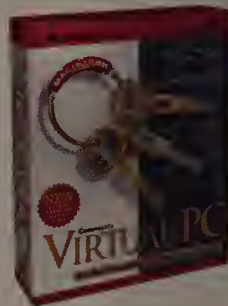
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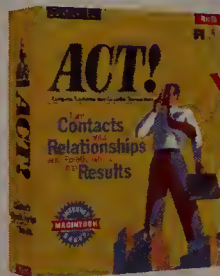
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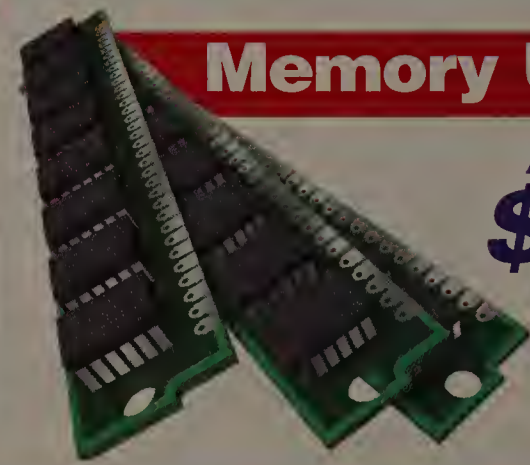
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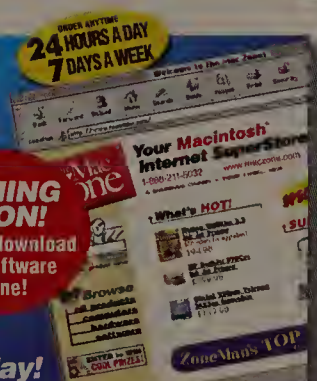
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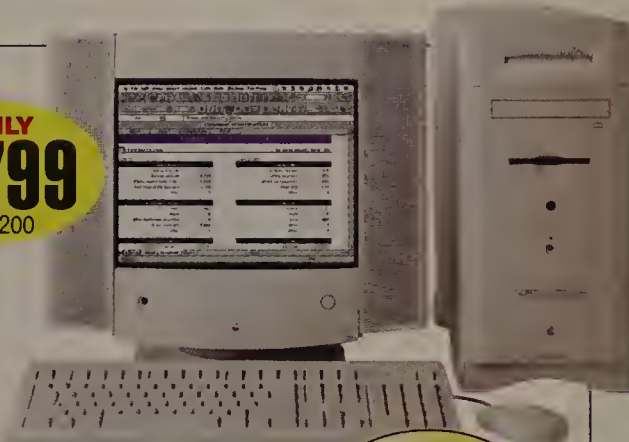
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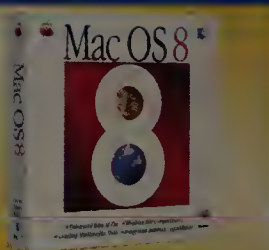
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Motorola Computers



StarMax 5000/300 MiniTower Computer

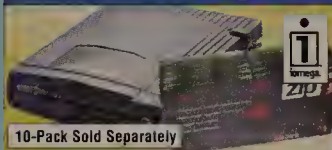
- PowerPC 603e 300MHz processor
- 32MB RAM • 4.3-gigabyte hard drive • 16X-speed CD-ROM drive • Built-in Iomega 100MB Zip drive • 512K cache • 10-Bose T Ethernet

\$2899⁹⁹ (MOT AMT53300)

StarMax 4000/160 MiniTower
160MHz, 32MB RAM, 2.5GB hard drive
(MOT AMT4160-6S) **\$1899.99**

StarMax 4000/200 MiniTower
200MHz, 32MB RAM, 2.5GB hard drive
(MOT AMT4200-6) **\$2699.99**

Data Storage



Iomega

- External SCSI Zip Drive
- Use as hard drive or as mobile storage • Increase data capacity with inexpensive and removable 100MB disks • Includes 1 disk, SCSI interface

\$149⁹⁹ (BER ZIP100SCSI)

SyQuest ezFlyer 230 SCSI Drive
(SYQ EZ230EXTMC) external . **\$199.99**

Iomega Jaz 1GB SCSI Drive
(BER JAZEXTSCSI) . external . **\$399.99**

SyQuest syjet 1.5GB Hard Drive
(SYQ SYJET1SE-09) . external . **\$499.99**

Business Software

Adobe PageMill (2.0)



\$99⁹⁹

After Dark (4.0)
by Berkeley **\$29.99**

Bookshelf 98- Ref. Library
by Microsoft **\$49.99**

Bryce 2 Accessory Kit
by MetaTools **\$44.99**

Communicator (4.0), Pra Ed.
by Netscape **\$59.99**

Conflict Catcher (4.0)
by Casady & Greene . **\$59.99**

Illustrator 7
by Adobe **\$399.99**

Connectix Virtual PC with Windows 3.11



\$149⁹⁹

Kai's Power Goa
by MetaTools **\$39.99**

MiniCAD (7.0)
by Diehl **\$549.99**

Norton Utilities (3.5)
by Symantec **\$99.99**

Office (4.21)
by Microsoft **\$479.99**

Organizer (2.0)
by Claris **\$69.99**

Painter (5.0) upgrade
by Fractal Design . **\$99.99**

Fractal Design Painter 5



\$229⁹⁹

QuarkXPress (3.32)
by Quark **\$649.99**

QuickBooks Pra (4.0)
by Intuit **\$199.99**

Quicken Deluxe (7.0)
by Intuit **\$59.99**

RAM Doubler (2.0)
by Connectix **\$59.99**

SAM (4.5)- Symantec AntiVirus
by Symantec **\$69.99**

SoftWindows 95 (4.0)
by Insignia **\$189.99**

MetaTools Kai's Photo Soap



\$39⁹⁹

Speed Doubler (2.0)
by Connectix **\$59.99**

Street Atlas USA (3.0)
by Delorme **\$44.99**

Up-To-Date & Contact (3.6.5)
by Now **\$89.99**

Virex (5.7)
by Data Watch **\$59.99**

Ward (6.01)
by Microsoft **\$299.99**

Works (4.0) Internet Edition
by Claris **\$89.99**

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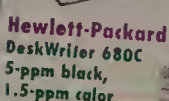
Apple Power Mac 6500/275

275MHz
32MB RAM
4GB Hard Drive
\$2999⁹⁹



Apple LaserWriter 4/600 PS

2MB
4-ppm
PostScript
\$799⁹⁹



Hewlett-Packard

DeskWriter 680C
5-ppm black,
1.5-ppm color
\$299⁹⁹



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External w/1 disk [JAZX] \$374
Media any qty [JAZC1GIGMAC] \$83

PCI WIDE CONTROLLERS

Adaptec Single [A2940MUW] \$279
Dual Channel [A3940MUW] \$529
Atto Express [ATTOEXP-PC1] \$310
Dual Channel [ATTOEXP2KIT] \$589

REMUS RAID SOFTWARE

RAID 0, 1 [REMUSLTD] \$99
RAID 0, 1, 4, & 5 [REMUS] \$139

MICROPOLIS 4GB HARD DRIVE

5400rpm, 10ms, 5yr wty
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External [MAC4300MCX] \$425

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100 PACK [CDR74-100] \$350
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External [MJS16XM] \$339

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• SCSI HARD DRIVES •

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						Int	Ext
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4550MB	7.9ms	7200rpm	512K	MC4345	5yr	\$599	\$659
9091MB	8.5ms	7200rpm	512K	MC3391	5yr	\$999	\$1059
ULTRA SCSI A/V - Drives fine tuned for audio and video applications. 2MB Buffer!							
4550MB	7.9ms	7200rpm	512K	MC4345AV	5yr	\$685	\$745
9091MB	8.5ms	7200rpm	512K	MC3391AV	5yr	\$1119	\$1179

ULTRA WIDE SCSI

4300MB	10ms	5400rpm	512K	MC4743W	5yr	\$385	\$475
4550MB	7.9ms	7200rpm	512K	MC4345W	5yr	\$619	\$709
9091MB	8.5ms	7200rpm	512K	MC3391W	5yr	\$1049	\$1139
ULTRA WIDE SCSI A/V - Drives fine tuned for audio and video applications. 2MB Buffer!							
4550MB	7.9ms	7200rpm	512K	MC4345WAV	5yr	\$709	\$799
9091MB	8.5ms	7200rpm	512K	MC3391WAV	5yr	\$1119	\$1209

Seagate

1050MB	9ms	5400rpm	512K	ST31055N	5yr	\$245	\$329
2150MB	11ms	5400rpm	128K	ST52160N	3yr	\$279	\$369
2150MB	8ms	7200rpm	1024K	ST32171N	5yr	\$479	\$560
4350MB	8ms	7200rpm	512K	ST34371N	5yr	\$706	\$819
9100MB	8ms	7200rpm	512K	ST19171N	5yr	\$1172	\$1232
23200MB	13ms	5400rpm	512K	ST423451N	5yr	\$2549	\$2649

WIDE SCSI

1050MB	9ms	5400rpm	512K	ST31055W	5yr	\$325	\$415
2150MB	8ms	7200rpm	1024K	ST32171W	5yr	\$509	\$599
4350MB	8ms	7200rpm	1024K	ST34371W	5yr	\$739	\$829
4550MB	7.5ms	10,000rpm	512K	ST34501W	5yr	\$885	\$975
9100MB	8ms	7200rpm	1024K	ST19171W	5yr	\$1215	\$1305
9100MB	8ms	10,000rpm	512K	ST19101W	5yr	\$1499	\$1589
23200MB	13ms	5400rpm	512K	ST423451W	5yr	\$2599	\$2749

Quantum

2151MB	10ms	5400rpm	128K	FB32160S	3yr	\$238	\$288
2275MB	8ms	7200rpm	512K	VK32275S	5yr	\$410	\$470
3228MB	10ms	5400rpm	128K	FB33240S	3yr	\$299	\$349
4310MB	10ms	5400rpm	128K	FB34320S	3yr	\$368	\$418
4550MB	8ms	7200rpm	512K	VK34550S	5yr	\$610	\$670
4550MB	8ms	7200rpm	512K	XP34550S	5yr	\$679	\$739
6448MB	10ms	5400rpm	128K	FB36480S	3yr	\$474	\$524
9100MB	8ms	7200rpm	512K	XP39100S	5yr	\$1049	\$1109

ULTRA WIDE SCSI

2275MB	8ms	7200rpm	512K	VK32275W	5yr	\$410	\$500
4550MB	8ms	7200rpm	512K	VK34550S	5yr	\$610	\$700
4550MB	8ms	7200rpm	512K	XP34550W	5yr	\$679	\$769
9100MB	8ms	7200rpm	512K	XP39100W	5yr	\$1049	\$1139

FUJITSU

2.5GB IDE DRIVE ONLY \$190

4400MB	8ms	7200rpm	512K	M2954S	5yr	\$575	\$669
9100MB	8ms	7200rpm	512K	M2949S	5yr	\$999	\$1059
WIDE SCSI							
4400MB	8ms	7200rpm	512K	M2954W	5yr	\$599	\$689
9100MB	8ms	7200rpm	512K	M2949W	5yr	\$1049	\$1139

We stock a complete line of IDE drives including Toshiba 2.5" IDE Hard Drives!

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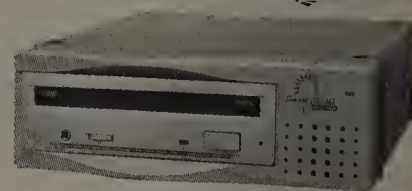
2x6 CD Recorder

- 2x record, 6x playback
- High quality Sony mechanism.
- Caddy loading
- Includes 5 FREE blank CDs.
- Includes #1 rated Adaptec Toast software.

Complete external only \$419

Duo Master with Jaz Drive \$729

CD-R media only \$3.50ea with this drive!



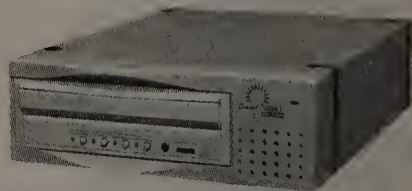
4x6 CD Recorder

- 4x record, 6x playback
- High quality Yamaha mechanism.
- Choose tray or caddy loading
- Includes 5 FREE blank CDs.
- Includes #1 rated Adaptec Toast software.

Complete external only \$639

Duo Master with Jaz Drive \$949

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- 2x record, 6x playback
- High quality Ricoh mechanism.
- Writes to CD-R or CD-RW media.
- Loading: Tray 1MB, Caddy 2MB.
- Includes 5 FREE rewritable CDs.
- Includes #1 rated Adaptec Toast software.

Complete 1MB external \$619

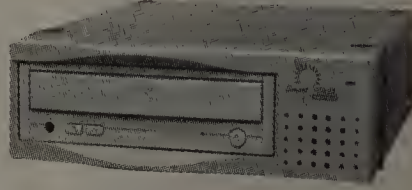
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NEC	16X	100ms	256K	Tray	\$189 [CDR1610XM]
Plextor	20X	95ms	512K	Tray	\$277 [PX20TSM]

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These tape drives include backup software and 1 FREE TAPE!

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2GB, 4mm, DAT, 12MB/min
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\$4229 [EXB10HXM]

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\$1949 [TSL7000XM]

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230MB Optical \$10 [TJ230]
640MB 3.5" Optical \$27 [TJ640]
2.6GB Optical \$43 [TJ2.6]
4.6GB Optical \$159 [OMDR4.6]
4mm120M tape \$19 [DAT120M]
4mm125M tape \$31 [DAT125M]
4mm Cleaning tape \$15 [DAT4MMCLEAN]
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DLT 20-40GB \$99 [DLT4]

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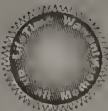
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8MB	\$59	#M1720
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SIMMS

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8MB	24MB	\$189	#M1859
16MB	32MB	\$209	#M1432
32MB	48MB	\$349	#M1861

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8MB	64MB	\$499	#M1853
16MB	96MB	\$849	#M1855
24MB	128MB	\$999	#M1857



CPU Upgrades

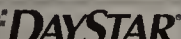
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200MHz	\$649	#A4418
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Adobe Premiere 4.2	\$349	#S1046
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4MB VRAM	\$349	#V9240
8MB VRAM	\$489	#V9238
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Yamaha

External Recordable CD Drive 4x6 w/Toast

\$699 #E7307



JackHammer Ultra-Wide PCI Accelerator

\$349 #A4434

PowerBooks®

Model	RAM	HDD	CDROM	Misc	Price	Part #
3400c/180CD	16MB	1.3GB	6x	Modem/10BT	\$3,495	#A1732
3400c/200	16MB	2GB	6x	Modem/10BT	\$4,199	#A1734
3400c/240	16MB	3GB	12x	Modem/10BT	\$5,399	#A1736
1400cs/117	12MB	750MB	10"	Dual Matrix	\$1,595	#A1720
1400cs/117	12MB	750MB	8x	10" Dual Matrix	\$1,795	#A1931
1400c/133	16MB	1GB	6x	10" Active Matrix	\$2,495	#A1726

Performas® and PowerMacs

Model	RAM	HDD	CDROM	Misc	Price	Part #
6400/180	16MB	1.6GB	8x	Basic Software	\$1,129	#A1199
6400/200	16MB	2.4GB	8x	Basic Software	\$1,299	#A1189
6400/200/Vid	32MB	2.4GB	8x	Avid Vid. Card	\$1,799	#A1905
6500/225	48MB	4GB	12x	Home Software	\$1,729	#A1945
6500/250	32MB	4GB	12x	Home Software	\$1,895	#A1937
6500/250	32MB	3GB	12x	SOHO	\$2,179	#A1943
6500/300	32MB	4GB	12x	Home Software	\$2,649	#A1939
6500/275	48MB	4GB	12x	Creative Studio	\$2,649	#A1941
7300/180	16MB	2GB	12x	2MB VRAM	\$1,849	#A1667
7300/200	32MB	2GB	12x	2MB VRAM	\$2,329	#A1668
9600/200	32MB	0GB	12x	w/ Keyboard	\$2,199	#A1949
9600/233	32MB	0GB	12x	w/ Keyboard	\$2,379	#A1739

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Power Macintosh®	Power Macintosh®	Power Macintosh®
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32MB 4GB/24xCD/ Zip Drive/1MB Cache	64MB 4GB/24xCD/ Zip Drive/1MB Cache	64MB 4GB/24xCD/ Zip Drive/1MB Cache
\$3,695 #A1957	\$5,295 #A1959	\$4,595 #A1961

Power Macintosh®	Power Macintosh®	Power Macintosh®
9600/200MP	9600/200MHz	9600/233MHz
32MB 4GB/12xCD/ 4MB VRAM	32MB 4GB/12xCD/ 4MB VRAM	32MB 4GB/12xCD/ 4MB VRAM
\$3,489 #A1672	\$2,795 #A1671	\$2,949 #A1738

5 Year Warranty on all
Starmax Computers

All Motorola Systems Listed Come With 32MB RAM

Model	Type	CPU	HDD	CDROM	Software	Price	Part #
3000/200	Minitower	603e	2.5GB	8x	SOHO	\$1,695	#A1052
3000/240	Minitower	603e	2.5GB	8x	SOHO	\$2,149	#A1054
3000/240	Minitower	603e	2.5GB	16x	Enterprise 1	\$2,295	#A1060
4000/160	Minitower	604e	1.5GB	8x	SOHO	\$1,879	#A1056
4000/200	Minitower	604e	2.5GB	8x	Basic	\$2,449	#A1063
4000/200	Minitower	604e	4.3GB	16x	Enterprise II	\$2,595	#A1062
5000/300	Minitower	603e	4.3GB	16x	Basic	\$2,395	#A1046
5000/300	Minitower	603e	4.3GB	16x	Enterprise II	\$2,999	#A1065

Thinking Macs??
Think UMAX

UMAX S900L - 604e TOWER CPU's

2-250MHz	250MHz	233MHz
64MB/4GB Ultra Raid/12xCD/ 8MB IMS/Internal Zip/ 100BaseT/Wide SCSI III	32MB/2.1GB Ultra /8xCD/ 8MB IMS/Internal Zip/ 100BaseT/Wide SCSI III	32MB/2.1GB/8xCD/ 8MB IMS Video Card
\$6,195 #A1935	\$3,395 #A1644	\$2,675 #A1648

2-200MHz	200MHz	J700-180MHz
32MB/2.1GB/8xCD/ 4MB IMS Video Card	32MB/2.1GB/8xCD/ 4MB IMS Video Card	Desktop Model 32MB/2.1GB/8xCD/ 2MB IMS Video Card
\$2,925 #A1646	\$2,325 #A1639	\$1,645 #A1634

FREE Astra 600S Scanner With Purchase of Any C600 System

Model	CPU	RAM	HDD	CDROM	Misc	Price	Part #
C500/180i	603e	16MB	1.2GB	8x	33.6Modem	\$1,075	#A1951
C500/180e	603e	16MB	1.2GB	8x	10BaseT	\$1,075	#A1953
C500/LT/180	603e	16MB	1.0GB	8x	1MB VRAM	\$925	#A1640
C600/180	603e	16MB	1.2GB	8x	33.6 Modem	\$1,049	#A1645
C600/L/200	603e	16MB	2.1GB	8x	33.6 Modem	\$1,225	#A1643
C600E/200	603e	32MB	2.1GB	12x	Zip/10BaseT	\$1,565	#A1707
C600/240	603e	24MB	2.1GB	8x	33.6 Modem	\$1,375	#A1649
C600X/240	603e	32MB	3.0GB	12x	10BaseT	\$1,819	#A1701
C600X/280	603e	32MB	4.0GB	12x	10BaseT	\$2,169	#A1705

Monitors

Apple

Multi-Scan 15AV	\$369	#M6909
Multi-Scan 1705	\$629	#M6638
Apple Vision 850	\$1549	#M6579
Multi-Scan 20"	\$1449	#M6564

RASTEROPS®



MC6215 17"	\$595	#M6927
MC6315 17" .22mm	\$695	#M6925
MC7515 19" .22mm	\$1095	#M6923
MC801 21" .22mm	\$1559	#M6527
MC801HR 21" .22mm	\$1759	#M6903

ViewSonic®

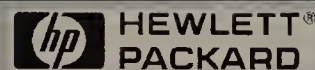
17GA	17" W/Speakers	\$649	#M6760
P815	21" Display .25mm	\$1599	#M6915
PT775	17" Display .25mm	\$879	#M6911
17EA	FLAT 17" Display .25mm	\$649	#M6761
17PS	17" Display .25mm	\$759	#M6781
G810	21" Display .25mm	\$1349	#M6780
GT770	17" Display .25mm	\$749	#M6766
PT770	17" Display .25mm	\$749	#M6783
PT813	FLAT 21" Display .28mm	\$1549	#M6913

SONY

Trinitron® Displays

100SF	15" Display .25mm	\$399	#M6590
200SX	17" Display .25mm	\$649	#M6593
200SF	17" Display .25mm	\$759	#M6584
300SFT	20" Display .30mm	\$1449	#M6586

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PACKARD

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6MP	600dpi, PS-2	\$899	#P3348
4MV	11"x17"	\$2295	#P3235
1600CM color	PS-2	\$1799	#P3410

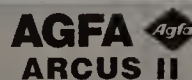
EPSON

Stylus 3000	17"x22", 1440dpi	\$1749	#P3488
Stylus Color 800	8.5"x11", 1440dpi	\$429	#P3483
Stylus Color 600	8.5"x11", 1440dpi	\$299	#P3485

APPLE Printers

Laser 16/600PS	\$1849	#P3250
Laser 12/640PS	\$1429	#P3248
Laser 4/600PS	\$799	#P3256
StyleWriter 1500	\$169	#P3369
StyleWriter 2500	\$219	#P3367
StyleWriter 2200	\$349	#P3282
StyleWriter 4100	\$249	#P3265
StyleWriter 4500	\$349	#P3271
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16X CD-ROM ATAPI	\$99
16X CD-ROM SCSI	150
CD-R 2X6 SCSI	449
Zip SCSI	149
230MB MO	290
Jaz SCSI w/one cart.	299
HyperDAT SCSI	749
HyperDAT Pro	849

Hard Drives

2GB SCSI Quantum	\$249
2.5GB IDE Quantum	159
3GB IDE Quantum	250
3GB SCSI Quantum	329
4GB SCSI Quantum	399
6GB SCSI Quantum	550
9GB SCSI Quantum	1290
9GB Wide Quantum	1340

RAID

6GB/12GB 5400rpm	\$1599.95
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9GB/18GB 7200rpm	2999.95

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16MB DRAM	\$99
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64MB DRAM	389
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2MB VRAM (EDO)	99
4MB VRAM (SGRAM)	150

CACHE

256K L2	\$51
512K L2	124

ACCESSORIES

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Hard Drive	✓ 2.5GB	2GB
Internal CD-Rom	✓ 16X	12X
RAM	✓ 32MB	✓ 32MB
Cache	✓ 512K level 2	256K level 2
VRAM	✓ 2MB	✓ 2MB
Monitor	✓ 15" Philips/Magnavox display	None
FREE Software	✓ Yes (\$1000)	Limited
Warranty	✓ 2 yr. limited	1 yr. limited
Price	✓ \$2,180	\$2,399

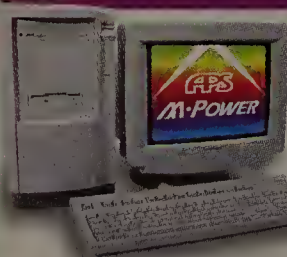
Power Mac information taken from the MacWarehouse Web Site 7/29/97

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includes 15" Monitor!

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- 2.5GB EIDE Hard Drive
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- 2MB VRAM
- 512K L2 cache
- Keyboard / Mouse
- 15" Philips/Magnavox display

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M•POWER 603e200

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- 16MB DRAM
- 1MB VRAM
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- Keyboard/Mouse
- Monitor not included

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Model	Description	Int.	SR 2000	APS Pro
APS Q 2000	Quantum Fireball Stratus, 2079MB, 5400 rpm	\$249 ⁹⁵	\$319 ⁹⁵	\$349 ⁹⁵
APS Q 3000	Quantum Fireball Stratus, 3118MB, 5400 rpm	\$329 ⁹⁵	\$399 ⁹⁵	\$429 ⁹⁵
APS Q 4000	Quantum Fireball Stratus, 4136MB, 5400 rpm	\$399 ⁹⁵	\$469 ⁹⁵	\$499 ⁹⁵
APS Q 4500	Quantum Viking, 4345MB, 7200 rpm	\$679 ⁹⁵	\$749 ⁹⁵	\$779 ⁹⁵
APS Q 4300	Quantum Atlas II, 4341MB, 7200 rpm	\$699 ⁹⁵	\$769 ⁹⁵	\$799 ⁹⁵
APS ST 4300	Seagate Barracuda, 4148MB, 7200 rpm	Call	899 ⁹⁵	929 ⁹⁵
APS ST 4500	Seagate Cheeta, 4348MB, 10000 rpm	N/A	N/A	999 ⁹⁵
APS Q 6400	Quantum Fireball Stratus, 6236MB, 5400 rpm	\$579 ⁹⁵	\$649 ⁹⁵	\$679 ⁹⁵
APS Q 9000	Quantum Atlas II, 8682MB, 7200 rpm	\$1,199 ⁹⁵	\$1,269 ⁹⁵	\$1,299 ⁹⁵
APS ST 9000	Seagate Barracuda, 8600MB, 7200 rpm	Call	\$1,419 ⁹⁵	\$1,449 ⁹⁵
APS ST 9100	Seagate Cheeta, 9000MB, 10000 rpm	N/A	N/A	\$1,699 ⁹⁵

APS HIGH-PERFORMANCE ULTRA SCSI DRIVES

Model	Description	Full Height
APS ST 23000	Seagate Elite 23, 22.1GB, 5400 rpm	\$2,999 ⁹⁵

APS ULTRA WIDE SCSI DRIVES*

Model	Description	Int.	SR 2000	APS Pro
APS Q 4500 W	Quantum Viking, 4345MB, 7200 rpm	\$699 ⁹⁵	\$769 ⁹⁵	\$799 ⁹⁵
APS Q 4300 W	Quantum Atlas II, 4341MB, 7200 rpm	829 ⁹⁵	899 ⁹⁵	929 ⁹⁵
APS ST 4300 W	Seagate Barracuda, 4148MB, 7200 rpm	N/A	999 ⁹⁵	1,029 ⁹⁵
APS ST 4500 W	Seagate Cheeta, 4348MB, 10000 rpm	N/A	N/A	1,049 ⁹⁵
APS Q 9000 W	Quantum Atlas II, 8682MB, 7200 rpm	\$1,199 ⁹⁵	\$1,269 ⁹⁵	\$1,299 ⁹⁵
APS ST 9000 W	Seagate Barracuda, 8600MB, 7200 rpm	N/A	\$1,469 ⁹⁵	\$1,499 ⁹⁵
APS ST 9100 W	Seagate Cheeta, 8683MB, 10000 rpm	N/A	N/A	\$1,749 ⁹⁵

APS POWERBOOK STORAGE

Model	Description	Int.
APS PowerBook Drive	IBM DCMA-21080, 1080MB, 4000 rpm	\$499 ⁹⁵

APS REMOVABLE DRIVES

Model	Description	Int.	SR 1000	SR 2000
APS SQ 5200	SyQuest 5200, 190MB	N/A	N/A	\$389 ⁹⁵
APS Jaz	(with 1 cartridge) 1GB	\$399 ⁹⁵	\$399 ⁹⁵	399 ⁹⁵

APS MO DRIVES

Model	Description	Int.	SR 1000	SR 2000
APS 230 MO	(with 1 cartridge) 217MB	N/A	\$299 ⁹⁵	\$379 ⁹⁵
APS 2.6GB MO	Sony SMO-F544, 2.4GB	N/A	N/A	\$1,799 ⁹⁵

APS CD-ROM DRIVES

Model	Description	External
APS CD16	16X CD-RDM in slimline case	\$179 ⁹⁵ *
APS CD-R	2X record/6X read CD-R (Phillips)	479 ⁹⁵
APS CD-R Plus	2X record/6X read CD-R (Sony)	449 ⁹⁵
APS CD-RW	2X record/6X read rewritable CD-Recordable	599 ⁹⁵
APS CD-R Pro	4X record/6X read CD-R in Pro Enclosure	679 ⁹⁵
APS CD-R Pro	4X record/6X read CD-R in Full Height Enclosure	899 ⁹⁵
APS Jaz/CD-R System	2X record/6X read CD-R	899 ⁹⁵

*Available in an SR 2000 Enclosure for an additional \$100.00

APS TAPE BACKUP SYSTEMS

Model	Description	Internal	External
APS HyperQIC™	Travan 4 Conner QIC 3095, 8GB	\$349 ⁹⁵	\$399 ⁹⁵
APS HyperDAT®	DDS-2DC, 8GB	749 ⁹⁵	799 ⁹⁵
APS HyperDAT® Pro	DDS-2DC, 8GB	849 ⁹⁵	899 ⁹⁵
APS HyperDAT® III	DDS-3DC, 24GB	\$1,149 ⁹⁵	\$1,199 ⁹⁵

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APS CD16

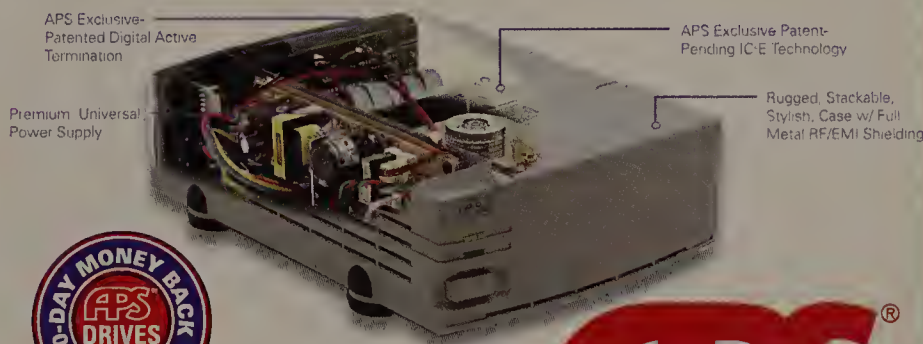
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Apple PowerBook DUO 270c Notebook	4	32					49	65	79	99	119	139	175	28=229				
Apple PowerBook DUO 280, 280c Notebook	4	40					49	65	79	99	119	139	175	28=249	36=329			
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Apple Macintosh IIfx (64 pin)	4	128					119					199					469	
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Apple Macintosh Classic II, LC, LCII	2/4	10	512k	59		24	30	64										
Apple Macintosh LCIII, LC475, LC550, LC575, LC580	4	36	256k	34			24	44				74			169			
Apple Macintosh LC520	5	36					24	44				74			169			
Apple Macintosh LC580	5	36					24	44				74			169			
Apple Macintosh LC499	4	36					24	44				74			169			
Apple Macintosh LC5200	5	36					24	44				74			169			
Apple Macintosh LC630	5	36					24	44				74			169			
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Apple Performa 400	4	10				10	20	80										
Apple Performa 405, 410, 430	4	10	512k	68		10	20	80										
Apple Performa 450, 460, 466, 467, 475, 476	4	36	256k/512k	34/68			24	44				99			149			
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Apple Performa 6117CD, 6118CD (pairs)	8/16	72					24	44				74			149			
Apple Performa 630, 630CD, 636	4	36					24	44				74			149			
Apple Performa 631CD, 636CD, 640CD	8	52					24	44				74			149			
Apple Performa 635CD	5	36					24	44				74			149			
Apple Performa 637CD, 638CD	8	36					24	44				74			149			
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Apple Performa 6200 Series 6220CD, 6230CD, 6290	8	64					24	44				74			149			
Apple Performa 6205CD, 6214CD	8	64					24	44				74			149			
Apple Performa 6300CD, 6320	16	64					24	44				74			149			
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Apple Quadra 610	4	68					24	44				74			149			
Apple Quadra 630	4	36					24	44				74			149			
Apple Quadra 650	4/8	132/136					24	44				74			149			
Apple Quadra 660AV	4	68					24	44				74			149			
Apple Quadra 700	4	68	512k	59			48					119					469	
Apple Quadra 800 (pairs)	8	136	512k	59			24	44				74			149			
Apple Quadra 840AV	8	128	512k	59			24	44				74			149			
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Apple Quadra 950	8	256	512k	59			48					119					469	
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Power Macintosh 5200, 5260, 5300		136			99/149		24		44			74			149			
Power Macintosh 5400		136			99/149				55			99			179		339	
Power Macintosh 6100/60, 6100/66, 6100/66AV (pairs)	8/16	72			29/-		24		44			74			149			
Power Macintosh 6200/75	8/16	72			29/-		24		44			74			149			
Power Macintosh 6400/200	8/16	72			29/-		24		55			99			179		339	
Power Macintosh 6500/225, /250, /275, /300	8/16	72			29/-		24		55			99			179		339	
Power Macintosh 7100/66, 7100/80, 7100/66AV (pairs)	8/16	136	512k	59	29/-		24		44			74			149			
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Power Macintosh 7300/166, /180, /200, 7500/100	8/16	256	1mg	49	69/109/229				55			99			179		339	
Power Macintosh 7600/100, /120, /132, /200	8/16	1gig/512	1mg	49	69/109/229				55			99			179		339	
Power Macintosh 8100/80, /100, /110	8/16	264	512k	59	29/109		24		44			74			149			
Power Macintosh 8100/80AV, /100AV, /110AV (pairs)	8/16	264	512k	59	29/109		24		44			74			149			
Power Macintosh 8500/120, /132, /150, /180	8/16	1gig/512	1mg	49	69/109/229				55			99			179		339	
Power Macintosh 8600/200, /233	8/16	1gig/512	1mg	49	69/109/229				55			99			179		339	
Power Macintosh 9500/120, /132, /150, /180MP, 200	8/16	768	2mg	87					55			99			179		339	
Power Macintosh 9600/200, /233, /200MP	8/16	768	2mg	87					55			99			179		339	
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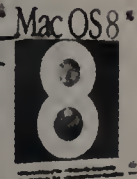
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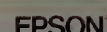


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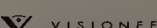
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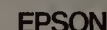


PaperPort vx 187.97

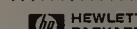
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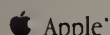
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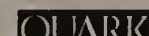
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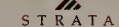
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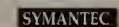
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3.2GB Stratus	QM33240STS	10ms	Ultra SCSI-3	5400	\$339	\$389
4.3GB Stratus	QM34320STS	10ms	Ultra SCSI-3	5400	\$399	\$449
4.5GB Viking	QM34550VKS	8ms	Ultra SCSI-3	7200	\$699	\$749
4.5GB Viking	QM34550VKS	8ms	UltraWide SCSI-3	7200	\$719	\$799
4.5GB Atlas II	QM34550ALS	8ms	Ultra SCSI-3	7200	\$729	\$779
4.5GB Atlas II	QM34550ALW	8ms	UltraWide SCSI-3	7200	\$799	\$879
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4.3GB Cheetah	ST34501N	8ms	Ultra SCSI-3	10000	\$929	\$979
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9.1GB Barracuda 9	ST19171N	8ms	Ultra SCSI-3	7200	\$1399	\$1449
9.1GB Barracuda 9	ST19171W	8ms	UltraWide SCSI-3	7200	\$1419	\$1499
23GB Elite 23	ST423451N	8ms	Fast SCSI-2	5400	\$2899	\$2999
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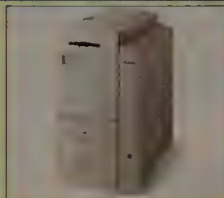
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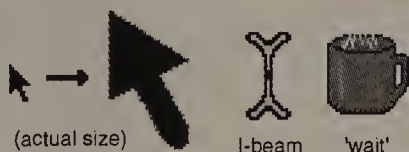


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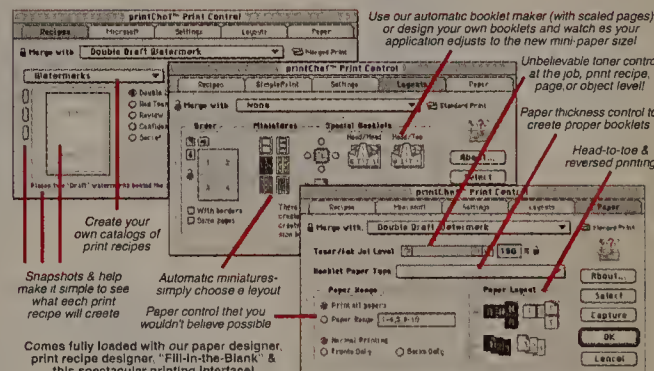
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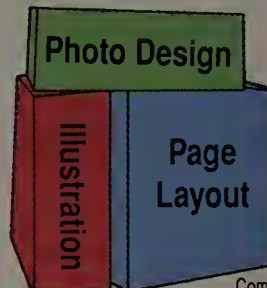
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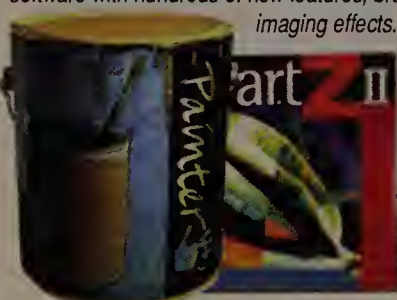
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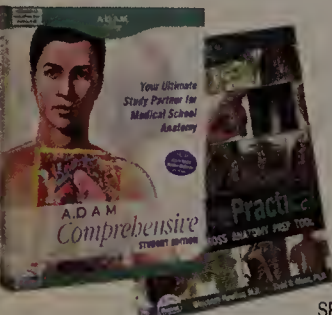


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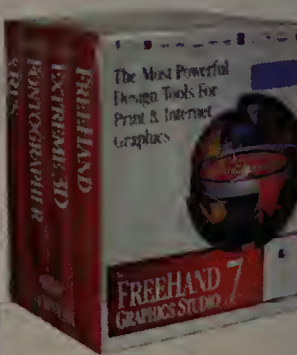


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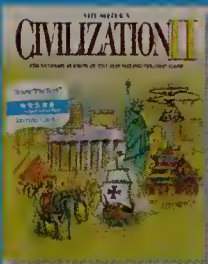
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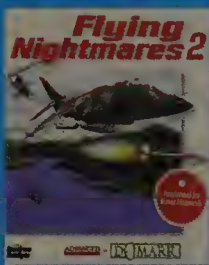
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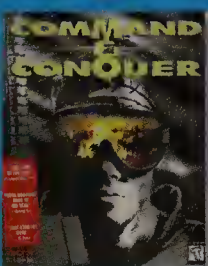
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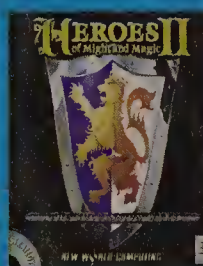
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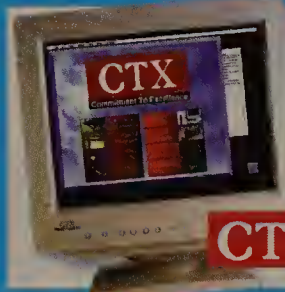
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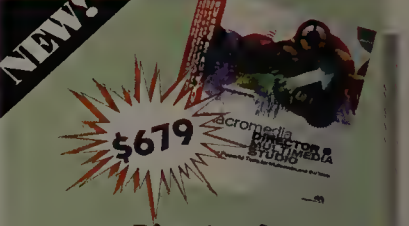
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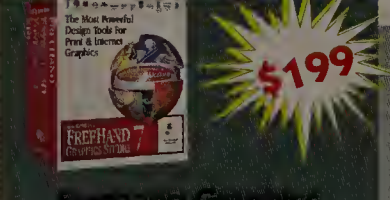
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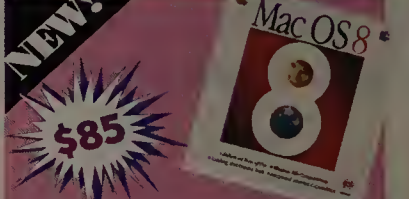
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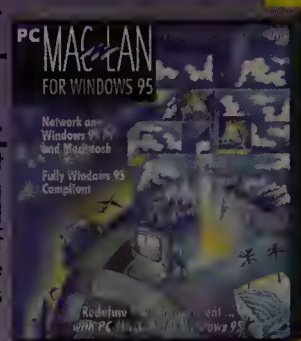
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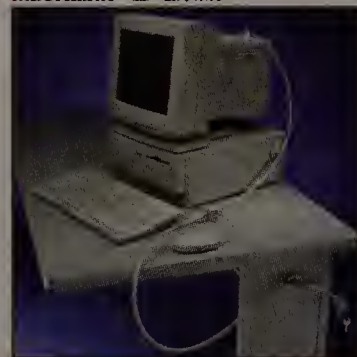
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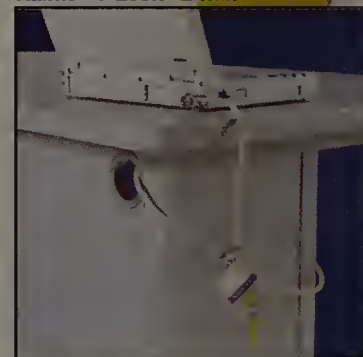
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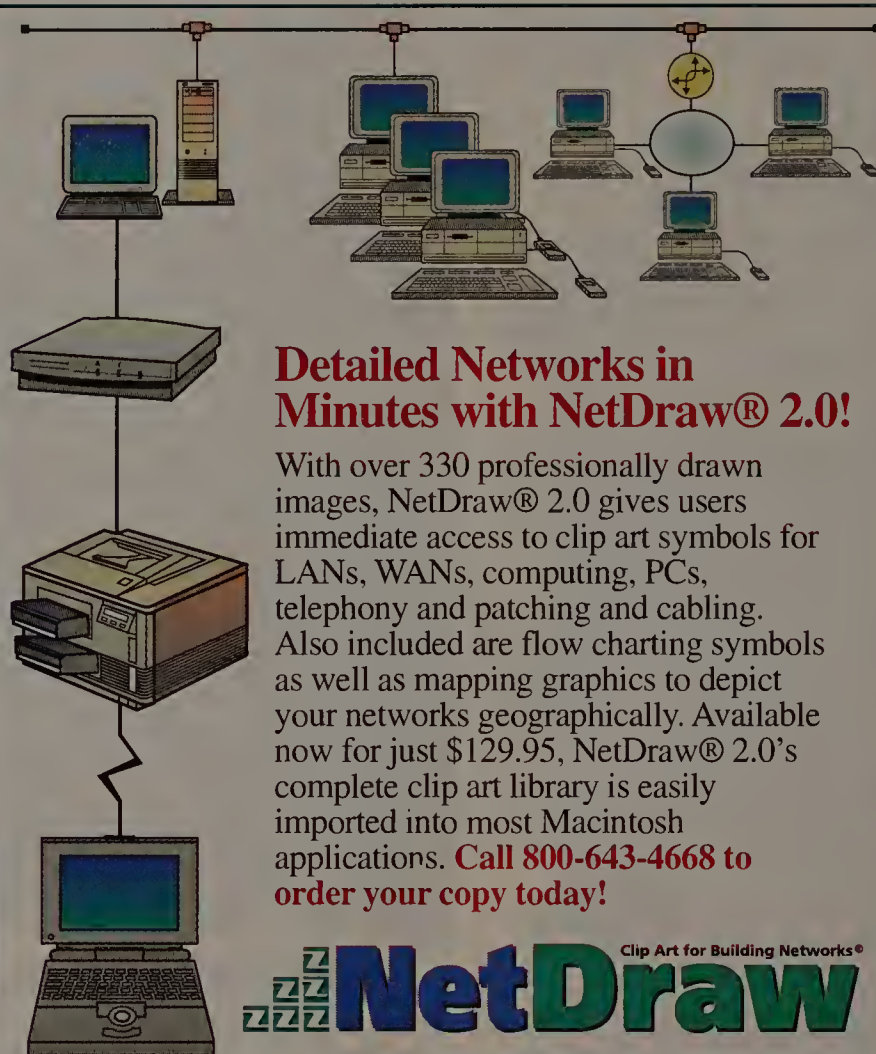
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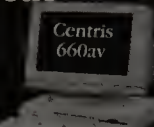
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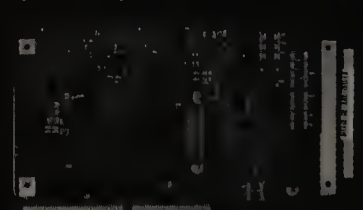
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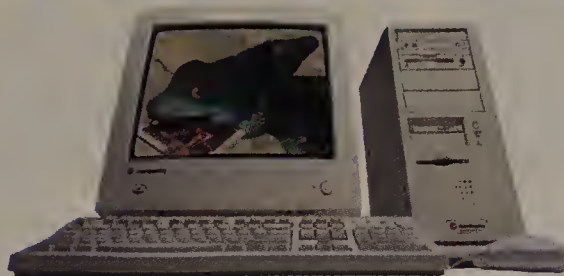
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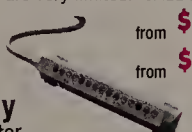
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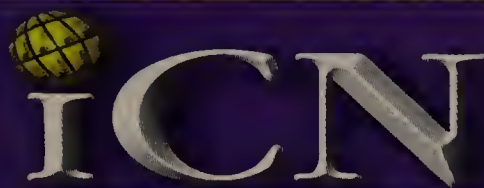
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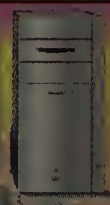
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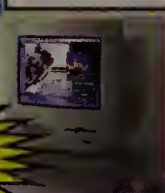
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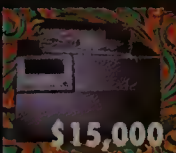
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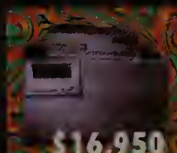
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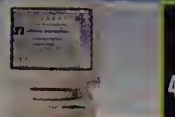
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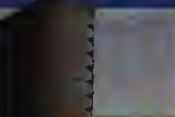
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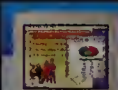
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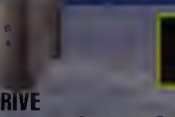
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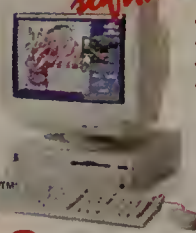


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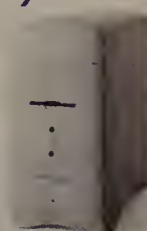
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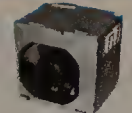
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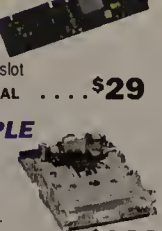
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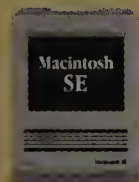
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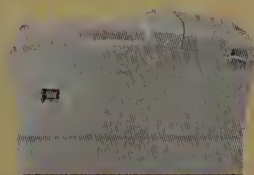
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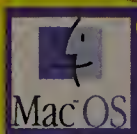
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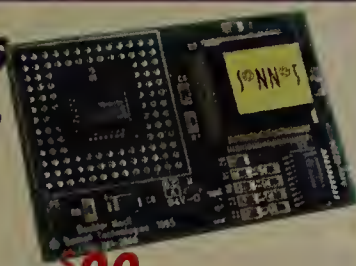
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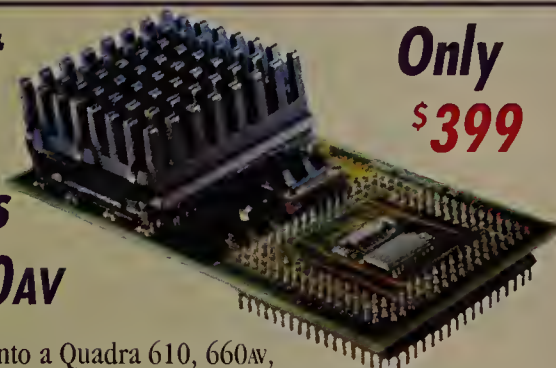
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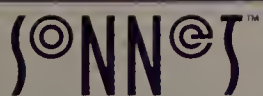
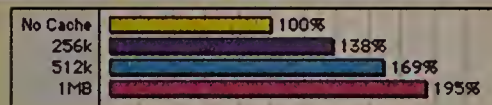
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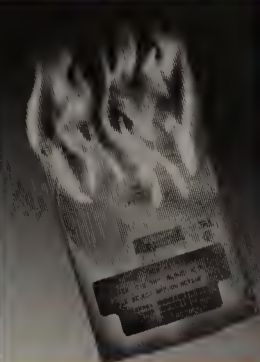
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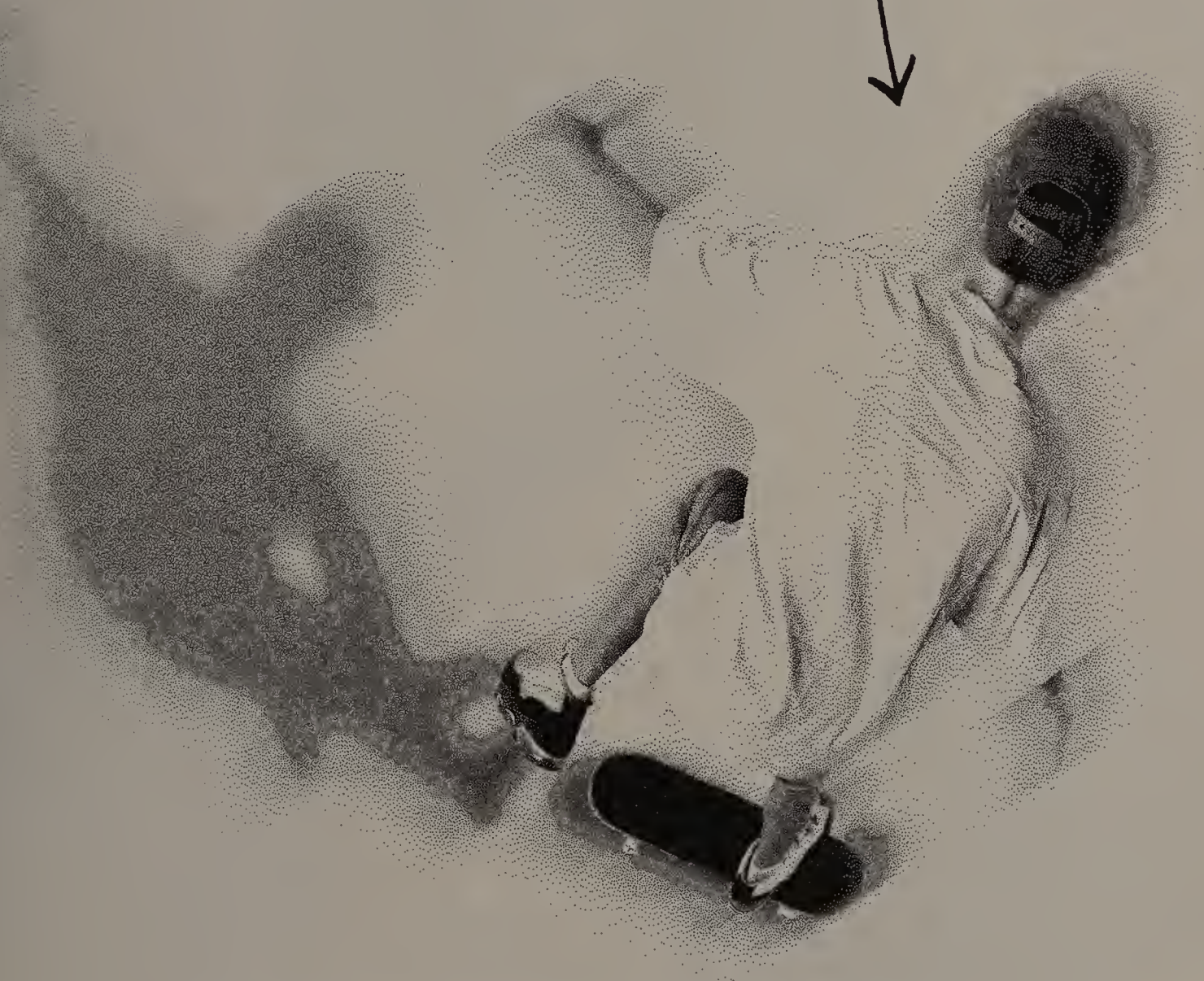
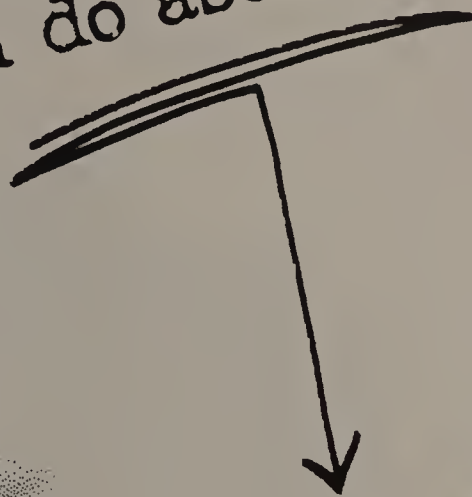
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continued from page 190

ting back where he found 'em!"

Yeah, I tell him, but warez traders deprive the software companies of income. "Not at all," he insists. "I'm 15. If software cost ten bucks, I'd buy it. But Electric Image Animation System is \$7000! I could never afford this stuff."

As it is, he does pay for some software: "Anything from Apple, and anything from a games company who's brought a PC program over to the Mac. I like to support them." (He also mentions that his dad gets all his Mac software through the usual mail-order channels, and disapproves of his son's warez hobby.) Furthermore, Jake says, most warezers don't even use what they download. Warez are like baseball cards; their value is the prestige of ownership. "I don't even know what half this stuff is," says Jake, eyeing one of the HotLine server lists.

"These kids have huge 3GB hard drives full of compressed software they can't even use, high-end stuff they don't have the manuals for," acknowledges Joshua Bauchner, litigation coordinator for the Software Publishers Association (SPA), which shuts down warez operations all the

time. Still, Bauchner told me, illegal is illegal; he estimates that \$5 billion of warez is transmitted *each day*—"We're talking about thousands of sites." While much of it is used only by teen warezers or not used at all, some of it is intercepted by grownups who do deprive the software companies of sales. "We send out about ten cease-and-desist letters a week," says Bauchner. "About 90 percent of the server operators immediately shut down voluntarily."

If they don't, the SPA files a lawsuit. Bauchner told me about a bust last year when the SPA filed suit against the mother of a 15-year-old warez. Just meeting a handful of briefcase-wielding SPA lawyers is often enough to change a warez's tune, he says. This kid's mother promised: "His @*&\$!! fingers will never touch a @*&\$!! keyboard again!"

Change of Heart

Still, I don't see Jake as a criminal; he's a smart kid who'll probably make a darned fine 3-D animator. As he starts closing windows of Jake's Infinite Online Software Emporium, I'm smiling indulgently at his harmless little hobby. I thank him for giving me a glimpse into the cybergangs who

ask for CD-ROM burners for their birthday and don't tell their parents what they're doing up there in their rooms all night. At least they're not pushing drugs and getting into trouble with their long music and loud hair. It's all in good fun, I'm thinking, a chance for shy teenage boys to be somebody—such as SKuLLZ, BLooD-MaSTeR, and CYBeRDeViL.

The SPA should get off its high horse, I'm thinking; you can't really blame the poor kids for wanting to—

"Hey, wait a minute!" I yelp as Jake's about to sign off. "What's that?" I'm stabbing my finger at the screen.

Jake grins. "Hey, you're famous."

There, in the list of warez, is *my own book*—the 16MB electronic edition of *Macworld Mac Secrets*, which took seven months of blood, sweat, and tears to write. One of these little creeps copied it off the CD that comes with the book and posted it for anyone to download!

Something must be done! Call the SPA! Somebody stop these kids! **m**

DAVID POGUE (www.pogueman.com) cowrote *Classical Music for Dummies* and *Opera for Dummies* (IDG Books Worldwide, 1997).



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The Desktop Critic

by David Pogue

Some WareZ over the Rainbow

MEET JAKE, HIS RECORDABLE CD, AND HIS \$200,000 OF SOFTWARE

JAKE IS 15. HE'S A STREET skater, a snowboarder, and a Mac fan, and the son of one of my clients. After I gave Jake's dad a Mac consultation a few months ago, Jake offered to give me an in-line skating lesson. There, in the park, in his affluent New York State suburb, Jake taught me something I've always wanted to know: how to stop.

A few nights later, Jake (not his real name) dropped me an e-mail. "Hey, if there's any software you need, let me know," he wrote. It was followed by a list of programs he was prepared to e-mail me—a list so long it made MacWarehouse look like MacCloset. SoftWindows, Illustrator, Photoshop. Microsoft anything, Adobe anything, Kai's Power anything. A hundred games and 20,000 fonts. So far, he's got 13 gigs of commercial software, compressed onto 18 recordable CDs.

Now, the Internet's shadow web of teen software pirates is nothing new to me; in fact, I even wrote about America Online's software-exchange chat rooms two years ago in *Macworld*. But this wasn't some faceless hacker in a dimly lit university cubicle; this was a kid I *knew*. So I asked if I could sit in on one of his pirating sessions to see what goes on.

Digital Baseball Cards

The great underground trading circle is made up mostly of boys, 12 to 18. "Some of these guys do nothing all day but sit there and trade. Their reputation online is their *life*. It's pitiful," Jake says. (Jake himself spends about six hours a day online—especially when he decides to take one of his three-week "vacations" from school. What he really wants to do is become a 3-D animator; as one of those, he says, "you can make unbelievable money.")

To make software trading feel even more dangerous, illicit, and exclusive, the teenagers have adopted a secret shorthand.

Software that's traded online is called *warez*. The traders describe each other as either *elite* (having lots of excellent stuff to upload) or *lamerz* (wannabes, guys who receive but don't give). It's trendy to use Zs instead of Ss, Ks instead of Cs, and Js instead of Gs, and to arbitrarily capitalize consonants: "i'M MaJiK SKuLLZ, KiNG oF THe FiLeZ!"

As Jake hooks up his PowerBook 1400 to a phone jack, he muses on the wild days of his youth in the early nineties. "There used to be all kinds of stuff you could do on America Online," he recalls. "We'd do this

according to Jake, AOL staffers gradually plugged the security loopholes. "Hardly anyone hacks on AOL anymore," he says.

Nowadays, the warez action is on the Internet. Using BBS programs like First-Class or HotLine, or in chat channels of the Internet's IRC protocol, individual teenagers set up software trading posts in their bedrooms. As I watch, Jake brings up a list of such sites, with names like NuKlear, Warez Depot, and SuPeR WaReZ. Anyone can join; the price of admission is an uploaded piece of commercial software. "This one guy's server? He's got 100 CDs of stuff available," Jake tells me with awe. "He has every single piece of Mac software released since 1984."

As I watch, Jake logs in to one of these software centers. One window is a chat room ("DeMoNBLoOD: Anyone got Photoshop 4?" and "DRaGoNTooTH: Need serial no. for Illustrator"). Another holds Finder-like folders organized by category: 3-D/Animation, Business Apps, Games, Manuals, Programming, System Software, Utilities, and so on. As Jake promised, every recognizable software title is there, plus many that are less familiar. The operator of this server has four CD-ROM drives daisy-chained to

his Mac, for 2.4 gigs of software at a time available for downloading.

Clear Conscience

Trading warez isn't about ripping off software companies, Jake says; in fact, warezers *aren't* ripping off software companies. "If I steal your dog, then I've got your dog and you don't. That's theft," he explains. "But we're not taking anything away from anyone! [Famous jailed hacker] Kevin Mitnick didn't steal those credit card numbers, he just copied them. They're still sit-

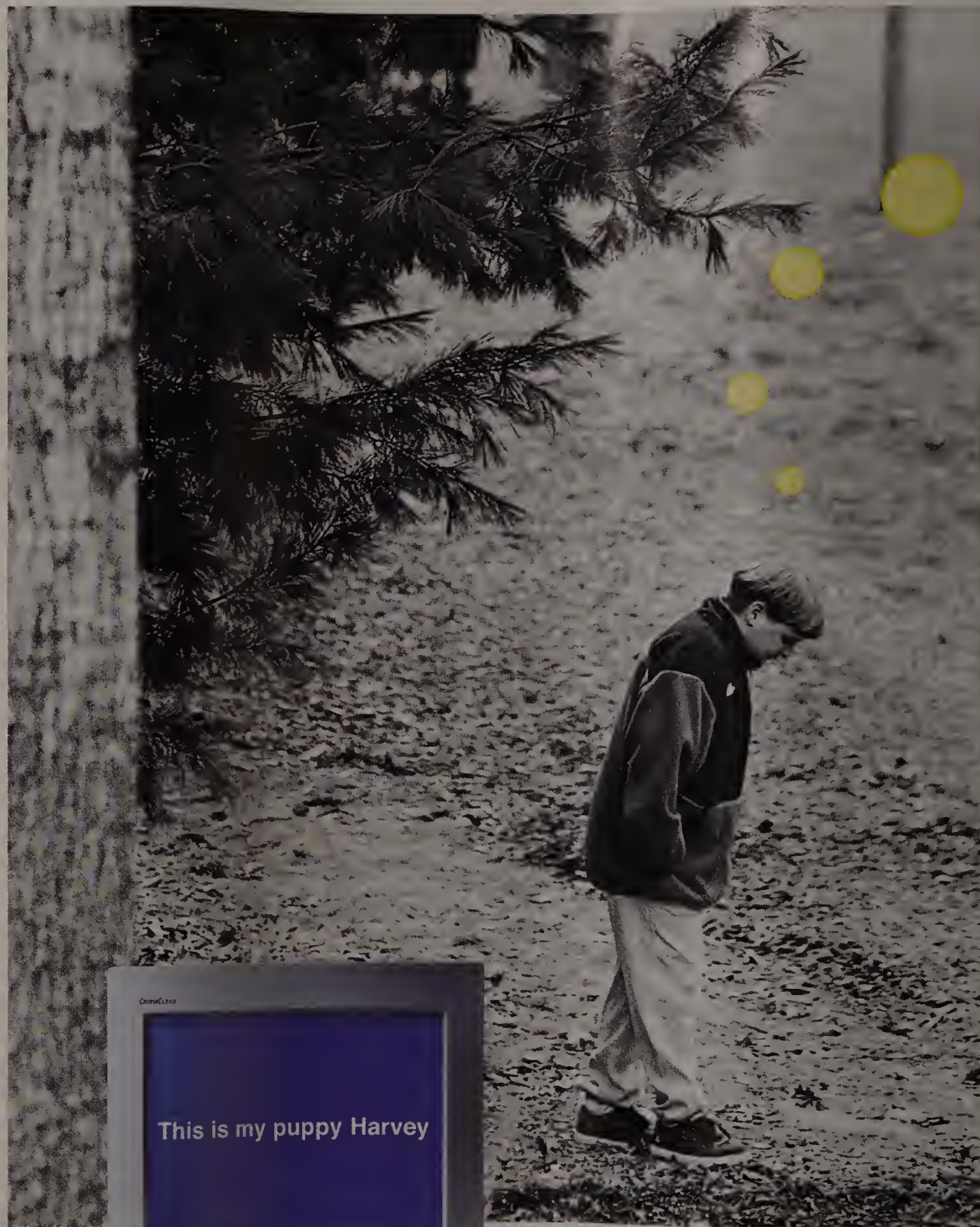
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thing called *morphing*, where you could go online as anybody at all." Using an illegal AOL plug-in, he says, "I could sign on as Steve Case, or anyone I wanted." AOL hackers also figured out how to hook in to several AOL administrative tools, including a *gagging* feature, he says. "That's when you make it so a certain member's comments don't show up in a chat room," he says. "You could gag everyone in a chat room except yourself. They're all going, 'Hey, how come nobody's answering me?'" He shakes his head ruefully, like a grandfather recalling his war days. Over time,

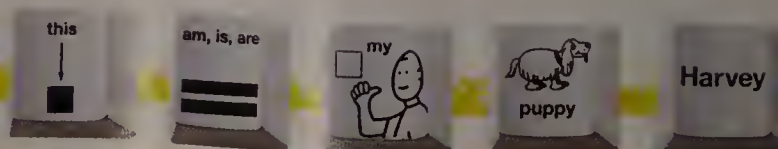
Christian Murphy was non-verbal. He lived with a wall between himself and the world.

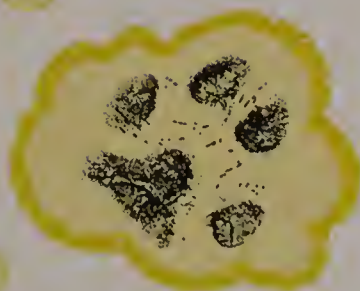
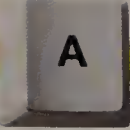
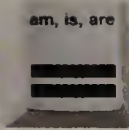




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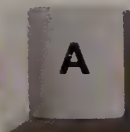
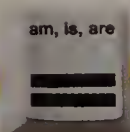
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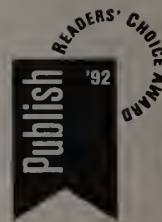
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